*COMPUTER SCIENCE & INFORMATION HANDBOOK*



***COLLEGE OF SCIENCE***

***In ZULFI***

***MAJMAAH UNIVERSITY***

***May- 2014***

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| وزارة التعليم العالي جـامـعـة الـمـجـمـعـة كلية بالزلفي العلوم  قسم علوم الحاسب والمعلومات | شعار اللمملكة | Ministry of Higher Education  Majmaah University  College Of Science  Department of Computer Science  And Information |

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***Handbook CSI Program***

***Department Of Computer Science & Information (CSI)***

***College of Science in Zulfi***

***1434 ـــ 1435H***

***2013 ـــ 2014***

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# Rector Messege of Majmaah university

Assalamu Alikum Warahmatu Allah Wabarakatu

On behalf of me and all the staff of Majmaah University, I would like to welcome you in the department guide of Computer Science & Information, college of Science, Majmaah University. It is well known to everyone that Higher Education institutions are deemed as the beacon of knowledge & enlightenment for entering the arena of research and development. The existence of Higher Education institutions also reflects the extent to which the government is greatly concerned about the quality of education provided to its people.

The Custodian of the Two Holy Mosques, King Abdullah Bin Abdul Aziz & His Crown Prince shall spare no efforts in overcoming any obstacle that may obstruct the educational process in the country.

We are full of hope that Majmaah University shall remain an edifice of knowledge that will generate well knowledgeable students who are capable to contribute with substance & value in the development of their country in all aspects of life.

The achievements of Majmaah University are all attributed to the efforts being exerted by those sincere people who have dedicated their time to make this university a well-respected one.

The directive of the Custodian of the Two Holy Mosques, King Abdullah Bin Abdul Aziz to establish the University of Majmaah, which will serve a vast number of students in the region, is also an obvious and concrete initiative from the government in supporting education.

  Wish you the best of luck

**Dr. Khalid Bin Saad Almuqrin**

**Recor of Majmaah University**

# 

# Dean of College of Science Messege

**All praise be to Allah.  Allah’s Peace and Blessings be upon Prophet Muhammad and his companions.**

**My dear student,**

**It is not new to your knowledge that we are living in a highly developed educational environment these days. For that, we should be very grateful to Allah, then to our wise government. Surely, you realize that these efforts have been exerted for you to increase and improve your capabilities, so be keen on gaining knowledge and utilizing everything you have.**

**My dear student, you should be aware that there are crucial elements to achieve great success. First and foremost, the obligatory prayers are very immensely important as they make you feel psychologically comfortable and closer to Allah. Second, Making prayers and sleeping early in order to be able to attend lectures with full concentration. Finally, communicating with teaching staff during office hours.**

**My dear student, recall that how quickly the previous academic years passed, and excellent students found the fruit of their hard labor, but less hardworking students found sorrow and bad feelings.**

**Dear Student, we highly appreciate your opinions, and we listen to you. We strive to serve you with all the potential available to us. To meet all your needs, we work as a team hoping to have you attend every academic, cultural and sports activities.**

**Dear Student, we are always keen to develop the educational environment in order to shift from teaching to learning to enable you improve your academic skills and elevate your knowledge.**

**Dear student, you are the main partner in the application of quality standards altogether so that we can get the academic accreditation. You must recognize the vision and mission of the college, its goals and career opportunities for graduates.**

**Dr. Mohammad Saleh Aloboudi**

**Dean of Faculty of Sciences in Alzulfi**

# 

# yosry_photo_2Department Head Messege

**All praise be to Allah.  Allah’s Peace and Blessings be upon Prophet Muhammad and his companions**

**It is an honor to write on behalf of my fellow faculty members in the Department of Computer Science and Information, Faculty of Science in Zulfi. I thank the Almighty ALLAH that made ​​me in this place in service of the department, the college, university and the community in general to contribute to the education of our students the new sciences and technologies that will have the better impact in the advancement of this country .**

**The Department of Computer Science and Information has been established and began its career with the establishment of the college in 1427/1428 in a response to the people of the region in getting the science and knowledge through higher education institution in the country of the Two Holy Mosques. This will provide the country with a decent, scientifically qualified graduates to work in the field of Computer and Information armed with the latest theoretical and practical experiences to cope with life in the academic and practical sides.**

**The college offers the graduates of the Department of Computer Science and Information the B.SC. degree of Computer Science and information after fulfilling a study of 161 credit hours distributed between theoretical and practical lessons that qualify them for admission to the labour market or pursue graduate studies.**

**The department has yet, praise to Allah, graduated a number of batches of students who have excelled with their study of science in those areas of Computer Science and Information .**

**The department of Computer Science and Information since its establishment until now is in continuous raising of its modern and renewed academic programs. The department has developed a program and study plan and has made changes in the curriculum to ensure the fulfilment of the best international standards in line with the rapid and continuous development in the field of Computer Science and Information and their applications in an effort to meet the growing needs of Saudi society. The department was keen to attract the best scientific talents in an effort to achieve higher levels of excellence and innovation in this field.**

**The Department of Computer Science and Information and behind it all the academic and administrative staff in the college are committed to helping students to develop their abilities in the context of a safe educational, respectful, and cooperation environment which reflects a high degree of commitment and seriousness that will help in the rehabilitation and preparing them to meet the requirements of the modern era**.

**Dr. Yosry A. Azzam**

**Head of the department of Computer Sciece and Information**

# 

# Introduction

The department of Computer Science and Information was established in the academic year 1427/1428 h, in coincidence with the establishment of the faculty of science in Zolfi, to meet the needs of different sectors in the Kingdom of this discipline, and to develop qualified and expertise required. The Department seeks to qualify the student to be after his graduation a specialist in the field of computer science in terms of study and analysis of computer system and methods of construction, as well as assisted software tools, such as operating systems, various programming languages ​​and computer networks. The curriculum has prepared to provide the student with the knowledge and skills necessary for him to be proficient in this field. The department staff is continuously working on updating the B.Sc. program to meet the latest technologies in computer science and the fast changing society needs. As so, it was found that it is necessary to revise the curriculum that has been used for more than 5 years.

## Department Mission

## Providing higher outstanding education to acquire graduates sufficient skills and knowledge to communicate and work effectively in teamwork through scientific environment to compete in labor market.

## Department Vision

Building an outstanding teaching environment that empowers the graduates in professional computing and contributes in development of an informatics knowledge society.

## Department Objectives

The most important objectives of the department are to produce high quality graduate having analytical, interpersonal skills with entrepreneurial and computer-based problem-solving mindset.

The following are the main objectives of the department:

1. Graduates should be able to deploy appropriate tools for development of computer-based solutions.
2. Graduates should be able to deploy effectively information systems used in modern computing practice.
3. Enable graduates to compete in the labor market.
4. Prepare graduates to be capable of communication and work effectively in teamwork.
5. Develop the scientific research in computer science and information.
6. Enable graduates to follow ethical responsibility.

In this sense, the Department of Computer Science and Information, Faculty of Science in Zulfi, Majmaah University seeks to provide an excellent program that cares to respond to the scientific and technical changes taking place in the world on one hand, and the requirements of the local community and the labor market in this area on the other hand. It is worthless to mention the need to develop curriculum plans and department labs in line with the rapid and great development in this field.

## Job Opportunities

Perhaps the most jobs available in the kingdom is to computer's graduates, and that is because of the great and rapid boom that  the kingdom is witnessing, and also because of the needs for computers in all aspects of life in both of public and private sectors. As examples we will mention some areas where graduates can work in:

1. The field of education and higher education.
2. The field of medicine and health.
3. The field of industry.
4. The field of banks, trade, and business.
5. The field of administration.
6. The field of e-government.
7. The military field, and many other areas.

## 

## University Service and Community

The computer entered various areas of life, in the fields of banks, industry, medicine, telecommunication and many others areas of life. Therefore, the university seeks to fill the growing needs for staff in this area through graduating students who are armed with good and strong knowledge on both theoretical and practical sides, and able to compete well in labor market, in the light of rapid and huge development witnessed in the kingdom.

For the community service the existence of qualified graduates in the field of computer science and information, contribute to the implementation of government policies to hire Saudis and  spread the information technology culture among young people.

The department is now implementing the diploma of Computer Science (IT networks) for high school students from the local community as well as the implementation of the program of “Tagseer” which give the graduates the Bachelor of Computer Science and Information. This program will permit many of the students from holders of intermediate certificate (diploma) from Zolfi province and neighboring provinces to benefits from. This will enable them to complete their studies to get a bachelor's degree in Computer Science and Information.

## General Committees in the Department

**1 – Department Supreme Committee: The tasks are:**

1. Supervise the implementation of the working plan in the program.
2. Choose advisor to assist in the rehabilitation of the department to the accreditation according to the standards of the commission of academic accreditation; in coordination with the Committee of Development and Quality.
3. Complete all the requirements for academic accreditation according to the standards of the National Commission of Academic Accreditation and Assessment (NCAAA).
4. Follow-up and coordinate with the committee of Development and Quality in the college and raising reports to it.
5. Prepare visual displays of the department and preparation of the department and program guides.

It should be mentioned that the members of this committee are the entire staff department.

**2 – Assessment and Accreditation Committee: The tasks are:**

1. Supervision, follow-up, preparation and collection of program specification, program report courses description and courses reports .
2. Overseeing the preparation of self-study report (SSR) of the department program .C- Supervise the preparation of a room inside the department reserved for assessment and accreditation documents which is equipped with the full program documents and is dedicated to the visits of the referees during periods of program assessment.
3. Provide a periodic report on the ratio of the completion of the requirements of accreditation.
4. Supervise the preparation of student exam forms and answer models of the program courses.
5. Overseeing the availability of teaching and learning tools for students in coordination with the relevant committees the department.

**3- Development and Quality Committee: The tasks are:**

1. Development, management and follow-up quality control operations in the department.
2. Follow-up and selection of the reference for the department programs .
3. Supervision and follow-up development plans and future planning of the department.
4. Follow up recent trends in the methodology of teaching techniques.
5. Identify training programs in the department to develop teaching, research and technical skills .
6. Prepare, distribute, collect and statistically analyse the results of students questionnaires related to the appropriateness of the program training during their study and the appropriateness of the courses to their work after graduation as well as their suggestions to maximize the utilization of these courses .

**4 – Academic Advising Committee: The tasks are:**

1. Raising awareness of the importance of academic accreditation to the department program through the meetings with the students and staff .
2. Maximize the concept of academic guidance and the role of the academic advisor in guiding the student to plan for his future education.
3. Preparation, distribution, collection and analysis of the results of questionnaires related to the academic guidance which are necessary for academic accreditation and provide recommendation for the program accordingly.
4. Increasing trust between students and teaching staff .
5. Receiving and responding to student complaints or suggestions .
6. Informing students by supporting services .

**5- Laboratory, Equipment, and Safety Committee: The tasks are:**

1. Ensure the availability of all laboratory equipment and student services.
2. Check the availability of maintenance plans of laboratories, equipment and student services.
3. Report periodically to the chief of the department and at the end of each academic year for repairs/adjustments.
4. Overseeing security and safety procedures in the laboratories and classrooms before the start of the semester and provide reports to the department chair.
5. Disseminate awareness, preparation and distribution of publications to students about safety of various risks (chemical-electrical-radioactive) at the beginning of the semester.
6. Put signs, safety procedures, and emergency telephone numbers in a prominent place in every classroom and laboratory.

**6- Follow-up of Alumni and Employment Committee: The tasks are:**

1. Personal data collection, classification and the means of contact with both of students and graduates.
2. Put a programme to reinforce the relations between the department and graduates as well as employers.
3. Preparation, distribution, collection and analysis of the results of questionnaires related to the satisfaction of graduates about their courses; and provide recommendation for the program accordingly.
4. Creation of effective mechanism to provide employment opportunities for graduates in their respective fields (for example, by convening meetings of employment – surveys to employers about their views on levels of graduates - exploring the views of employers about the important subjects and courses of the program and the department).
5. Activation of communication with graduates (such as the alumni association).
6. Survey of graduates who joined jobs on their assessment of the usefulness of the program and the contents of their previous study.

**7- Training and Community Service Committee: The tasks are:**

1. Collection and classification of projects carried out by the department and its members and their contributions to community services and development plans.
2. Promoting and developing the initiatives of students to maximize the role of community service through seminars and publications, in coordination with the relevant committees in the department.
3. Deeping the communication between the college and the organisations responsible for development plans in Saudi Arabia.
4. Develop programs to strengthen the relationship between the Department and the community and follow up their implementation.
5. Searching for places and announcing them to students to implement their summer training in, which is necessary for their graduation.
6. Follow up of students during their summer training by contacting the persons responsible for the training and making sudden visits to those places.

**8. Graduate studies and scientific research Committee: The tasks are:**

1. Developing a system for monitoring, documentation and dissemination of research data and participate in conferences.
2. Establish and update of database of research published by the teaching staff in the department.
3. Encourage scientific publication in scientific journals that have world good rankings.
4. Announce of research of the department members on website and update them annually.
5. Do the tasks referred to it by the college unit of postgraduate studies and research.
6. Register of current research projects being implemented and those ended with their names announced on the website including their revenue to society.
7. Make annual assessment of scientific research projects of the department and raise recommendations to college’ unit of postgraduate studies and research.

**9- Teaching Assistants, lecturers and scholarships Committee: The tasks are:**

Its mission is to examine the credentials of applicants to demonstrator and lecturer degrees and conducting personal interviews with them and complete the rest of their procedures for getting the job in the department. The functions of the committee are also the coordination and communication with department people studying abroad and who are conducting their master's and doctoral degrees to remain in constant contact with the department during the period of travel.

# Full List of All Department Members

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **E-mail** | **Degree** | **Institution Graduated**  **From** | **Specific**  **Specialty** | **General Specialty** | **Academic Rank** | **Faculty/**  **Teaching Staff Names** |
| y.azzam@mu.ed.usa | Ph.D. | Japan- Egypt | Artificial Intelligence | Computer Engineering & Automatic Control | Associate Professor | Azzam, Yosry |
| h.aly@mu.edu.sa | Ph.D. | Vienna | Cryptography | Computer Science | Associate Professor | Ali, Hassan |
| y.salem@mu.edu.sa | Ph.D. | USA-Egypt | Mobile Networks | Computer Science & Engineering | Assistant Professor | Abdallah, Yasser |
| m.eltantawi@mu.edu.sa | Ph.D. | Italy | Software Engineering | Computer Science & Engineering | Assistant Professor | Tantawy, Mostafa |
| m.wagieh@mu.edu.sa | Ph.D. | Germany-Egypt | Network Security | Computer Science | Assistant Professor | Abo El\_Soud, Mohamed |
| w.slem@mu.edu.sa | Ph.D. | Kazakhstan | Neural Networks | Computer Science | Assistant Professor | Khedr, Wael |
| z.abdoun@mu.edu.sa | Ph.D. | Poland | ATM Networks | Computer Science & Engineering | Assistant Professor | Abdoun, Zeiad |
| l.banimelhim@mu.edu.sa | M Sc. | Malaysia | Computer Science | Computer Science | Lecturer | Melhem, Loai |
| m.alauthman@mu.edu.sa | M Sc. | Jordan | Computer Science | Computer Science | Lecturer | Alauthman, Mohamed |
| s.smadi@mu.edu.sa | M Sc. | Jordan | Computer Science | Computer Science | Lecturer | Samadi, Sami |
| i.alsmadi@mu.edu.sa | M Sc. | Jordan | Computer Science | Computer Science | Lecturer | Samadi, Issa |
| m.alkhaldy@mu.edu.sa | M Sc. | Jordan | Computer Science | Computer Science | Lecturer | Al Khaldy , Mohammad |
| n.laban@mu.edu.sa | M Sc. | Egypt | Computer Science | Computer Science | Lecturer | Laban, Nour El-Din |
| h.alquhayz@mu.edu.sa | M Sc. | UK | Information Security | Computer Science | Lecturer | Alquhayz, Hani |
| r.almushrafy@mu.edu.sa | M Sc. | Australia | IT | Computer Science | Lecturer | Almushrafy, Riyadh |
| a.alruban@mu.edu.sa | M Sc. | USA | Information Security | Computer Science | Lecturer | AlRuban, Abdul-Rahman |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **E-mail** | **Degree** | **Institution Graduated**  **From** | **Specific**  **Specialty** | **General Specialty** | **Academic Rank** | **Faculty/**  **Teaching Staff Names** |
| m.alharbi@mu.edu.sa | M.Sc. | UK | Software Engineering | Computer Engineering | Demonstrator | AlFaredy, Mafawez |
| a.alourani@mu.edu.sa | M.Sc. | USA | Databases | Computer Science | Demonstrator | Aloreeny, Abdullah |
|  | B.Sc. | USA | Computer Science | Computer Science | Lecturer | AlHarby, Talal |
| b.aldremyh@mu.edu.sa | B.Sc. | USA | Computer Science | Computer Science | Demonstrator | Aldremyh , Bader |
| t.almasoud@mu.edu.sa | B.Sc. | Saudi Arabia | Computer Science | Computer Science | Demonstrator | Al Masoud , Thamer |
| sh.almasar@mu.edu.sa | B.Sc. | Saudi Arabia | Computer Science | Computer Science | Demonstrator | Almasaar, Shaeaa |

# Department Laboratories

The department includes seven laboratories for teaching and aims to provide applied and suitable environment and create the conditions for the students to take advantage of the possibilities of the university available. The university provided the hardware needed to promote the theoretical concepts of computer science that studied by students as well as scientific research for faculty members belonging to the department and other university departments. The laboratories have been equipped with the latest hardware and tools.

**The department laboratories include the following:**

1. **Networks Lab.**
2. **Operating systems Lab.**
3. **Databases Lab.**
4. **Logic Design Lab.**
5. **Assembly Language Lab.**
6. **Preparatory lab 1.**
7. **Preparatory lab 2**
8. **Preparatory lab 3**

|  |  |
| --- | --- |
| 1- Networks Lab This lab is equipped with the latest hardware and software that cover all the aspects of the Networks courses. The lab has been equipped with 25 new PCs with high-speed network in addition to all the equipment needed to train students on how to set up and manage networks. It also contains a modern server, router, switches and all the equipment for wired and wireless networks. |  |
|  |  |
| 20131119_190844.jpg | 2- Databases Lab The lab is equipped with 30 PCs and database software such as Oracle and SQL server and all the software necessary for the students to be trained to set up and handle databases. The laboratory is equipped with high-speed network connected to a server to cover all practical aspects of databases and design of graphics interfaces and visual programming.. |
|  |  |
| 3- Logic Design and Assembly Language Lab The lab contains 16 modern units for logic design such that the student will be able to understand the principles of logic circuits and how to design, connect, and build logic gates and digital circuits. The laboratory contains also 16 modern units of 8086 and 6800 microprocessors for the students to be able to program them practically. |  |
|  |  |
| 4-Operating Systems Lab Contains more than 25 sophisticated device in addition to the operating systems software such as Windows and Linux .It also has the networking necessary to qualify the students to deal with all the operating systems in addition to the existence of a sophisticated network. The lab will be useful for giving students the practical skills necessary to be able to deal with all computer operating systems. |  |
|  |  |
|  | 5- Preparatory Lab 1 The Lab is equipped with 28 modern and specialized PCs that are running Windows 7 and have Office 2010 and other Basic SW that help preparatory year students to acquire basic computer skills. In addition, there is a modern network that helps the students to acquire basic network skills needed to deal with the computer and its applications in practical life. |
| 6- Preparatory Lab 2 The Lab is equipped with 28 modern and specialized PCs that are running Windows 7 and have Office 2010 and other Basic SW that help preparatory year students to acquire basic computer skills. In addition, there is a modern network that helps the students to acquire basic network skills needed to deal with the computer and its applications in practical life. |  |
| 20131119_190844.jpg | 7- Preparatory Lab 3 The Lab is equipped with 28 modern and specialized PCs that are running Windows 7 and have Office 2010 and other Basic SW that help preparatory year students to acquire basic computer skills. In addition, there is a network that helps the students to acquire basic network skills needed to deal with the computer and its applications in practical life. |

# Computer Science and Information (CSI) Program

The department staff proposed a new revised curriculum which offers a B.Sc. in computer science and information (CSI) in three tracks. This new curriculum leads to a program which fosters diversification through offering a wider selection of courses that is in tune with the market requirements and provides the necessary specialization by offering a set of new concentrations (tracks).We believe this will render our graduates more marketable. The proposed program satisfies and fulfils the IEEE/ACM Computing Curricula guidelines for computer science curriculum and meets the Computing Accreditation Criteria (CAC). Moreover, it takes into account the community needs and the labor market in KSA.

Students of the CSI program have 12 hours of department elective courses. The following set of concentration tracks within the Bachelor of Science major in Computer Science and Information is offered which allows three tracks for students to choose from:

Track I-Computer Graphics and Multimedia**:** In this track the students will be allowed to choose four courses from the following five courses which may lead them to work in the field of Computer Graphics & Multimedia:

1. **Computer Vision**
2. **Interactive Computer Graphics**
3. **Digital Photography**
4. **Digital Image Processing**
5. **Multimedia Technology**

Track II-Computer Networks: In this track the students will be allowed to choose four courses from the following five courses which may lead them to work in the field of computer networks:

1. **Advanced Computer Networks**
2. **Network Security**
3. **Wireless & Mobile Computing**
4. **Network Programming**
5. **Cloud Computing**

Track III-Individual Track**:** It is a general elective courses track that allow students to choose any four courses either from of the last two tracks or from the following courses:

Track III-Individual Track**:** It is a general elective courses track that allow students to choose any four courses either from of the last two tracks or from the following

courses:

1. Computer Vision
2. Interactive Computer Graphics
3. Digital Photography
4. Digital Image Processing
5. Multimedia Technology
6. Advanced Computer Networks
7. Network Security
8. Wireless & Mobile Computing
9. Network Programming
10. Cloud Computing
11. Machine Learning
12. Introduction to Robotics
13. Expert Systems
14. Computational Methods
15. Operational Research
16. Information System Management
17. Information Security
18. Project Management
19. Geographic Information System (GIS)

The concentrations are structured in a manner that meets the following general objectives. In the first six semesters, all B.Sc.-CSI students will experience a streamlined introduction to Computer Science &Information with an emphasis on conceptual, theoretical, and programming aspects. The intent of this common foundations to provide a solid basis for all CSI majors and the ultimate pursuit of the specialty majors. The mathematical and science requirements are kept consistent with what is expected for computer science and information majors.

Students have the opportunity to start focusing on a specific concentration of their choice after their 6th semester. During the third and fourth years, the program is structured to emphasize the choice and exploration of a concentration in depth.

## CSI Program Educational Objectives

The Educational Objectives of the Computer Science & Information undergraduate Program are:

1. Prepare graduates, who are entering immediately into professions upon graduation, to be capable of performing duties on an entry-level computing-related position.

2. Enable graduates to pursue graduate studies to successfully complete an advanced degree.

3. Enhance graduates to work as individuals with minimum guidance and as leaders or members of a team.

4. Encourage graduates to follow appropriate practices within a professional, legal, and ethical framework.

5. Prepare graduates to recognize the need for and be capable of pursuing life-long learning.

## CSI Program Learning Outcomes

The CSI program enables students to acquire, by the time of graduation, the following learning outcomes which allows graduates to be able to:

1. apply knowledge of computing and mathematics appropriate to the discipline including simulation and modelling.
2. analyse a problem to identify and define the computing requirements appropriate to its solution.
3. design, implement, develop and evaluate complicated computer-based system, process, component, or program to meet desired needs.
4. function effectively on teams to accomplish a common goal.
5. understand professional, ethical, legal, security and social issues and responsibilities.
6. communicate effectively with a range of audiences.
7. analyse the local and global impact of computing on individuals, organizations, and society.
8. Recognize the need for and an ability to engage in continuing professional development.
9. use current techniques, skills, and tools necessary for computing practice.
10. use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, web systems and technologies.
11. identify and analyse user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
12. effectively integrate IT-based solutions into the user environment.
13. understand of best practices and standards and their application.

# Curriculum for the Computer Science& Information Program

The Bachelor Degree of Science in Computer Science and Information is awarded at the College of Science in Zulfi, Majmaah University after the successful completion of 161 credit hours and after fulfilling the terms and conditions for awarding the bachelor degree at the faculty of Science. These 161 credits are distributed as follows:-

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirements** | **Mandatory** | **Elective** | **Total** |
| University Requirements | 2 | 10 | 12 |
| College Core Requirements | 29 | 0 | 29 |
| Mathematics and Sciences Requirements | 23+9 (from college core Req.) | 0 | 23 |
| Department Core Requirements | 81 | 12 | 93 |
| Summer Training Requirements | 1 | 0 | 1 |
| Free Elective Course | 0 | 3 | 3 |
| **Total** | **136** | **25** | **161** |

## Foundation Year Core Requirements (College core Requirements) (29 Credits):

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course Number** | **Course Title** | **Credit Hours** | **Weekly Hours** | | | **Prerequisite** |
| **Lecture** | **Lab** | **EX** |  |
| PENG 111 | Preparatory English (1) | 8 | 20 | 0 | 0 | - |
| PMTH 112 | Introduction to Mathematics (1) | 2 | 2 | 0 | 1 | - |
| PCOM 113 | Computer Skills | 2 | 1 | 2 | 0 | - |
| PSSC 114 | Learning and Communication Skills | 2 | 1 | 2 | 0 | - |
| PENG 121 | Preparatory English (2) | 6 | 14 | 0 | 0 | PENG 111 |
| PENG 123 | English for Science and Engineering | 2 | 2 | 0 | 0 | PENG 111 |
| PMTH 127 | Introduction to Mathematics (2) | 4 | 4 | 0 | 1 | PMTH 112 |
| PPHS 128 | General Physics | 3 | 2 | 2 | 0 | - |
|  | **Total** | **29** | **48** | **2** | **0** |  |

## University Requirements (12 Credits):

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course Number** | **Course Title** | **Credit Hours** | **Weekly Hours** | | **Elections** | **Total Credits** |
| **Lecture** | **Lab** |
| ZPSY 211 | Educational & Thinking Skills | 2 | 2 | **0** | **Mandatory** | 2 |
| SALM 101 | Introduction to Islamic Culture | 2 | 2 | 0 | **Students choose 3 courses** | 6 |
| SALM 102 | Islam and Society Building | 2 | 2 | 0 |
| SALM 103 | Economic System in Islam | 2 | 2 | 0 |
| SALM 104 | Fundamentals of Political System in Islam | 2 | 2 | 0 |
| ARAB 101 | Arabic Language Skills | 2 | 2 | 0 | **Students choose 1 course** | 2 |
| ARAB 103 | Arabic Writing | 2 | 2 | 0 |
| ELEC 101 | Principles of Health and Fitness | 2 | 2 | 0 | **Students choose 1 course** | 2 |
| ELEC102 | Business Entrepreneurship | 2 | 2 | 0 |
| SOCI 101 | Societal Issues | 2 | 2 | 0 |
| LHR 101 | Human Rights Systems | 2 | 2 | 0 |
| FCH 101 | Family and Childhood | 2 | 2 | 0 |
| VOW 101 | Volunteering Systems | 2 | 2 | 0 |
|  |  | **Total** | | | | **12** |

## Mathematics and Sciences Requirements (31 Credits):

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course Number** | **Course Title** | **Credit Hours** | **Weekly Hours** | | | **Prerequisite** |
| **Lec.** | **Lab.** | **EX.** |
| PMTH 112 | Introduction to Mathematics (1) | 2 | 2 | 0 | 1 |  |
| PMTH 127 | Introduction to Mathematics (2) | 4 | 4 | 0 | 1 | PMATH 112 |
| PPHS 128 | General Physics | 3 | 2 | 2 | 0 |  |
| PHYS 217 | Physics 2 | 3 | 2 | 2 | 0 | PPHS 128 |
| CHEM 225 | General Chemistry | 2 | 2 | 0 | 0 | - |
| MATH 212 | Calculus I | 3 | 3 | 0 | 1 | PMTH 127 |
| MATH 220 | Calculus II | 3 | 3 | 0 | 1 | MATH 212 |
| MATH 310 | Linear Algebra & Differential Equations | 4 | 3 | 0 | 2 | MATH 220 |
| Stat 320 | Probability & Statistics | 3 | 3 | 0 | 1 | MATH 220 |
| CSI 212 | Discrete Math for Computer Science 1 | 3 | 2 | 0 | 2 | PMTH 127 |
| CSI 222 | Discrete Math for Computer Science 2 | 2 | 2 | 0 | 0 | CSI 212 |
|  | **Total** | **32** | **28** | **4** | **8** |  |

## 

## Department Requirements (93 Credits):

**4-a) Mandatory Department Courses (81 CHs):**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course Number** | **Course Title** | **Credits Hours** | Weekly Hours | | | Prerequisite |
| **Lec** | Lab | Ex |
| **ENG 210** | **Technical English** | **2** | **2** | **0** | **0** | **PENG 121** |
| **CSI 211** | **Programming 1** | **3** | **2** | **2** | **0** | **PCOM 113** |
| **CSI 221** | **Programming 2** | **3** | **2** | **2** | **0** | **CSI 211** |
| **CSI 223** | **Digital Logic Design** | **3** | **2** | **2** | **0** | **PHYS 217** |
| **CSI 224** | **Fundamentals of Information Systems** | **3** | **3** | **0** | **0** | **---** |
| **CSI 311** | **Visual Programming** | **3** | **2** | **2** | **0** | **CSI 221** |
| **CSI 312** | **Data Structure** | **3** | **2** | **2** | **0** | **CSI 221, CSI 212** |
| **CSI 313** | **Computer Organization and Assembly Language** | **3** | **2** | **2** | **0** | **CSI 223** |
| **CSI 314** | **Database** | **3** | **2** | **2** | **0** | **CSI 211** |
| **CSI 321** | **Design & Analysis of Algorithms** | **3** | **2** | **0** | **2** | **CSI 312** |
| **CSI 322** | **Computer Networks** | **3** | **2** | **2** | **0** | **CSI 224** |
| **CSI 323** | **Computer Architecture** | **3** | **3** | **1** | **0** | **CSI 313** |
| **CSI 324** | **Advanced Database** | **3** | **1** | **4** | **0** | **CSI 314** |
| **CSI 325** | **Software Engineering 1** | **3** | **2** | **2** | **0** | **CSI 221** |
| **CSI 411** | **Artificial Intelligence** | **3** | **2** | **2** | **0** | **CSI 321** |
| **CSI 412** | **Operating Systems** | **3** | **2** | **2** | **0** | **CSI 313** |
| **CSI 413** | **Compiler Design** | **3** | **2** | **2** | **0** | **CSI 222** |
| **CSI 421** | **Distributed Systems & Parallel Processing** | **3** | **2** | **2** | **0** | **CSI 321** |
| **CSI 422** | **Software Engineering 2** | **3** | **2** | **2** | **0** | **CSI 325** |
| **CSI423** | **Cryptography** | **3** | **3** | **1** | **0** | **CSI 321** |
| **CSI 425** | **Computer Graphics** | **3** | **2** | **2** | **0** | **Math 310** |
| **CSI 510** | **Graduation Project 1** | **2** | **2** | **0** | **0** | **120 Cr. Hrs** |
| **CSI 511** | **Web Programming & Internet Technology** | **3** | **2** | **2** | **0** | **CSI 322** |
| **CSI 512** | **Data Mining** | **3** | **2** | **2** | **0** | **CSI 314** |
| **CSI 513** | **Concepts of Programming Languages.** | **3** | **2** | **2** | **0** | CSI 222 |
| **CSI 520** | **Graduation Project 2** | **3** | **3** | **0** | **0** | **CSI 510** |
| **CSI 522** | **Human Computer Interaction** | **3** | **2** | **2** | **0** | **CSI 511** |
| **CSI 525** | **Professional Ethics** | **2** | **2** | **0** | **0** | **CSI 422** |
|  | **Total** | **81** | **59** | **44** | **2** |  |

**4-b) Department Elective Courses (12 Credit Hrs):**

- Student must select 4 courses from either of the next three tracks:-

**Track I: Computer Graphics and Multimedia**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course**  **Number** | **Course Title** | **Credits Hours** | **Weekly Hours** | | **Prerequisite** |
| **Lecture** | **Lab** |
| CSI 414 | Digital Image Processing | 3 | 2 | 2 | MATH 310 |
| CSI 424 | Computer Vision | 3 | 2 | 2 | CSI 414 |
| CSI 514 | Interactive Computer Graphics | 3 | 2 | 2 | CSI 425 |
| CSI 521 | Multimedia Technology | 3 | 2 | 2 | CSI 425 |
| CSI 530 | Digital Photography | 3 | 2 | 2 | MATH 220 |

**Track II: Computer Networks**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course**  **Number** | **Course Title** | **Credits Hours** | **Weekly Hours** | | **Prerequisite** |
| **Lecture** | **Lab** |
| CSI 431 | Advanced Computer Networks | 3 | 2 | 2 | CSI 322 |
| CSI 432 | Network Security | 3 | 2 | 2 | CSI 431 |
| CSI 531 | Wireless & Mobile Computing | 3 | 2 | 2 | CSI 322 |
| CSI 532 | Network Programming | 3 | 2 | 2 | CSI 431 |
| CSI 533 | Cloud Computing | 3 | 2 | 2 | CSI 322 , CSI 321 |

**Track III: Individual Track:** Student should select his courses from the above two tracks or from the following table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course**  **Number** | **Course Title** | **Credits Hours** | **Weekly Hours** | | **Prerequisite** |
| **Lecture** | **Lab** |
| CSI 441 | Machine Learning | 3 | 2 | 2 | CSI 411 |
| CSI 442 | Introduction to Robotics | 3 | 2 | 2 | CSI 411 |
| CSI 443 | Expert Systems | 3 | 2 | 2 | CSI 411 |
| CSI 444 | Computational Methods | 3 | 2 | 2 | Math 310 |
| CSI 445 | Operational Research | 3 | 2 | 2 | STAT 320, MATH 310 |
| CSI 446 | Information System Management | 3 | 2 | 2 | CSI 314 |
| CSI 447 | Information Security | 3 | 2 | 2 | CSI 423 |
| CSI 448 | Project Management | 3 | 2 | 2 | CSI 422 |
| CSI 449 | Geographic Information Systems (GIS) | 3 | 2 | 2 | **CSI 324** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Preparatory Year**  **Curriculum Plan** | | | | | | | | | | | | | | | | | |
| **Prereq.** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** | **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | | | **Course Name** | | **Course Code** | |
| **PENG 111** | **6** | **0** | **0** | **14** | **Preparatory English (2)** | **PENG 121** | **--** | **8** | **0** | **0** | **20** | | | **Preparatory English (1)** | | **PENG 111** | |
| **PENG 111** | **2** | **0** | **0** | **2** | **English for Science and Engineering** | **PENG 123** | **--** | **2** | **1** | **0** | **2** | | | **Introduction to Mathematics (1)** | | **PMTH 112** | |
| **PMTH 112** | **4** | **1** | **0** | **4** | **Introduction to Mathematics (2)** | **PMTH 127** | **--** | **2** | **0** | **2** | **1** | | | **Computer Skills** | | **PCOM 113** | |
| **--** | **3** | **0** | **2** | **2** | **General Physics** | **PPHS 128** | **--** | **2** | **0** | **2** | **1** | | | **Learning & Communication Skills** | | **PSSC 114** | |
| **29** | **15** | | | | **Total** | | **--** | **14** | | | | | | **Total** | | | |
| **First Year** | | | | | | | | | | | | | | | | | |
| **Prereqe** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** | **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | | | **Course Name** | | **Course Code** | |
| **CSI 211** | **3** | **0** | **2** | **2** | **Programming 2** | **CSI 221** | **PCOM 113** | **3** | **0** | **2** | **2** | | | **Programming 1** | | **CSI 211** | |
| **CSI 212** | **2** | **0** | **0** | **2** | **Disc. Math For CS 2** | **CSI 222** | **PMTH 127** | **3** | **2** | **0** | **2** | | | **Disc. Math for CS 1** | | **CSI 212** | |
| **MATH 212** | **3** | **1** | **0** | **3** | **Calculus 2** | **MATH 220** | **PMTH 127** | **3** | **1** | **0** | **3** | | | **Calculus 1** | | **MATH 212** | |
| **PHYS 217** | **3** | **0** | **2** | **2** | **Dig. Logic Design** | **CSI 223** | **PPHS 128** | **3** | **0** | **2** | **2** | | | **Physics 2** | | **PHYS 217** | |
| **--** | **3** | **0** | **0** | **3** | **Fund. of Inf. Systems** | **CSI 224** | **PENG 121** | **2** | **0** | **0** | **2** | | | **Tech. English** | | **ENG 210** | |
| **--** | **2** | **0** | **0** | **2** | **General Chemistry** | **CHEM 225** | **--** | **2** | **0** | **0** | **2** | | | **Educational & Thinking Skills** | | **ZPSY 211** | |
| **32** | **16** | | | | **Total** | |  | **16** | | | | | | **Total** | | | |
| **Second Year** | | | | | | | | | | | | | | | | | |
| **Prereq.** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** | **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | | | **Course Name** | **Course Code** | | |
| **CSI 312** | **3** | **2** | **0** | **2** | **Design & Analysis of**  **Algorithms** | **CSI 321** | **CSI 221** | **3** | **0** | **2** | **2** | | | **Visual Programming** | **CSI 311** | | |
| **CSI 313** | **3** | **0** | **2** | **2** | **Computer Networks** | **CSI 322** | **CSI 221, CSI 212** | **3** | **0** | **2** | **2** | | | **Data Structure** | **CSI 312** | | |
| **CSI 313** | **3** | **0** | **1** | **3** | **Computer Architecture** | **CSI 323** | **CSI 223** | **3** | **0** | **2** | **2** | | | **Computer Organization and Assembly Language** | **CSI 313** | | |
| **CSI 314** | **3** | **0** | **4** | **1** | **Advanced Database** | **CSI 324** | **CSI 211** | **3** | **0** | **2** | **2** | | | **Database** | **CSI 314** | | |
| **CSI 221** | **3** | **0** | **2** | **2** | **Software Engineering 1** | **CSI 325** | **Math 220** | **4** | **2** | **0** | **3** | | | **Linear Alg. & Diff. Eq.** | **MATH 310** | | |
| **MATH 212** | **3** | **1** | **0** | **3** | **Probability & Statistics** | **STAT 320** | **--** | **2** | **0** | **0** | **2** | | | **Elective Islamic Course 1** | **ISL \*\*\*** | | |
| **36** | **18** | | | | **Total** | |  | **18** | | | | | | **Total** | | | |
| **Third Year** | | | | | | | | | | | | | | | | | |
| **Prereq.** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** | **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | | **Course Name** | | | | **Course Code** |
| **CSI 321** | **3** | **0** | **2** | **2** | **Distributed Systems &**  **Parallel Processing** | **CSI 421** | **CSI 321** | **3** | **0** | **2** | **2** | | **Artificial Intelligence** | | | | **CSI 411** |
| **CSI 325** | **3** | **0** | **2** | **2** | **Software Engineering 2** | **CSI 422** | **CSI 313** | **3** | **0** | **2** | **2** | | **Operating Systems** | | | | **CSI 412** |
| **CSI 321** | **3** | **0** | **1** | **3** | **Cryptography and Information Security** | **CSI 423** | **CSI 222, CSI 221** | **3** | **0** | **2** | **2** | | **Compiler Design** | | | | **CSI 413** |
| **Math 310** | **3** | **0** | **2** | **2** | **Computer Graphics** | **CSI 425** | **\*\*\*** | **3** | **\*** | **\*** | **\*** | | **Elective Course 1** | | | | **\*\*\*** |
| **\*\*\*** | **3** | **\*** | **\*** | **\*** | **Elective Course 2** | **\*\*\*** | **--** | **2** | **0** | **0** | **2** | | **Elective Arabic Course** | | | | **ARAB \*\*\*** |
| **--** | **2** | **0** | **0** | **2** | **Elective Islamic Course 3** | **ISL \*\*\*** | **--** | **2** | **0** | **0** | **2** | | **Elective Islamic Course 2** | | | | **ISL\*\*\*** |
|  |  |  |  |  |  |  | **72 Cr. Hrs** | **1** | **0** | **0** | **1** | | **Summer Training** | | | | **CSI 400** |
| **34** | **17** | | | | **Total** | |  | **17** | | | | **Total** | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Fourth Year** | | | | | | | | | | | | | |
| **Prereq.** | **Cr** | **Ex** | **Lb** | **Le** | **Course** | **Course Code** | **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course name** | **Course Code** |
| **CSI 510** | **3** | **0** | **0** | **3** | **Graduation Project 2** | **CSI 520** | **120 Cr. Hrs** | **2** | **0** | **0** | **2** | **Graduation Project 1** | **CSI 510** |
| **CSI 511** | **3** | **0** | **2** | **2** | **Human Computer Interaction** | **CSI 522** | **CSI 322** | **3** | **0** | **2** | **2** | **Web Programming**  **& Internet Technology** | **CSI 511** |
| **CSI 422** | **2** | **0** | **0** | **2** | **Professional Ethics** | **CSI 525** | **CSI 314** | **3** | **0** | **2** | **2** | **Data Mining** | **CSI 512** |
| **\*\*\*** | **3** | **\*** | **\*** | **\*** | **Elective Course 4** | **\*\*\*** | **CSI 222** | **3** | **0** | **2** | **2** | **Concepts of Prg. Lang.** | **CSI 513** |
| **\*\*\*** | **3** | **\*** | **\*** | **\*** | **Free Elective Course** | **\*\*\*** | **\*\*\*** | **3** | **\*** | **\*** | **\*** | **Elective Course 3** | **\*\*\*** |
|  |  |  |  |  |  |  | **\*\*\*** | **2** | **0** | **0** | **2** | **Elective Prereq. Univ.** | **\*\*\*** |
| **30** | **14** | | | | **Total** | |  | **16** | | | | **Total** | |

# 

# Courses Description

**Level 3**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** |
| PCOM 113 | 3 | 0 | 2 | 2 | Programming 1 | CSI 211 |
| PMTH 127 | 3 | 2 | 0 | 2 | Disc. Math for CS 1 | CSI 212 |
| PMTH 127 | 3 | 1 | 0 | 3 | Calculus 1 | Math 212 |
| PPHS 128 | 3 | 0 | 2 | 2 | Physics 2 | PHYS 217 |
| PENG 121 | 2 | 0 | 0 | 2 | Tech. English | ENG 210 |
| -- | 2 | 0 | 0 | 2 | Educational & Thinking Skills | ZPSY 211 |
|  | **16** | | | | **Total** | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **PCOM 113** | **3** | **3** | **0** | **2** | **2** | **CSI 211** | **Programming 1** |

**Course Specification:**

**Lectures:**

This course introduces the students to basic programming concepts and constructs. Student gain fundamental experience in how C++ is used. Topics include: control structures, functions, recursion, arrays, pointers and strings of the C++ programming language. The course introduces students to structured, top-down programming design and implementation. This course should serve as a foundation for programming to the students in the programming.

**Lab:**

Introduction to C++ Programming (2weeks) - Introduction to Classes (2 weeks) - Control Statements (4weeks) -Functions and Recursion (2 weeks) - Class Templates array and vector- Pointers(2wweeks).

**Objectives:**

1. Construct error free C++ programs
2. Divide a problem into its logical components.
3. Understand the basic structured programming concepts.
4. Design and code small to medium sized problems from the start using C/C++ constructs, such as input/output statements, if-then-else statements, while and for loops, functions, …
5. Employ some of the available data structures in C++ such as built-in data types, arrays and pointers to solve programming problems.
6. Use the required developments tools to write, compile, trace and debug C++ programs.

**Outcomes:**

1. Apply knowledge of computing and mathematics appropriate to the discipline.
2. Analyze a problem, and identify and define the computing requirements appropriate to its solution.
3. Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
4. An ability to function effectively on teams to accomplish a common goal. (Reformulate)
5. Understand professional, ethical, legal, security, and social issues and responsibilities.

**Textbook and References:**

**Text Book:**

* Deitel and Deitel, " C++: How To Program ", 2010, Prentice Hall, ISBN 978-007351725.

**Essential References:**

* De D. S. Malik, " C++ Programming: From Problem Analysis to Program Design ", Course Technology, ISBN 061916042X.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **PMTH 127** | **3** | **3** | **2** | **0** | **2** | **CSI 212** | **Discrete Mathematics for Computer Science 1** |

**Course Specification:**

**Lectures:**

The current course introduces the basic concepts of logic and its tools. This enables problem formulation in a logical manner, so logical way of thinking can be applied to the real life. These objectives can be successfully achieved through the conduction of the following topics: Propositional Logic; Set Theory; Proofs; Functions, Sequences, and Relations; Methods of Counting; Recurrence Relations; Graph Theory and Introduction to Trees.

**Objectives:**

1. Learning propositional calculus that can help to formulate problems in a logical
2. manner. This logical way of thinking can be also applied to the real life
3. Problem solving capabilities.
4. Formal way of thinking.
5. Structures in computer science.

**Outcomes:**

1. Analyze, Describe and Test the problem formally
2. Recognize different methods to attack a problem
3. Locate and classify the main versions of structures
4. Analyze relationships between objects
5. Organize the relationships between a problem and other objects
6. Assess the different alternative solutions to solve the problem to select the optimal one.

**Textbook and References:**

**Text Book:**

* Richard Johnsonbaugh, “Discrete Mathematics” , Prentice Hall, 7th Edition, 2009.

**Essential References:**

* Steven Roman, “An Introduction to Discrete Mathematics”, HBJ Publishers and its subsidiary, Academic Press, 2nd Edition, 1989.
* Steven G. Krantz; “The Elements of Advanced Mathematics”, Chapman & Hall/CRC, 2nd Edition, 2002.
* W. D. Wallis, “A Beginner's Guide to Discrete Mathematics”, Birkhauser, 2003

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **PMTH 127** | **3** | **3** | **1** | **0** | **3** | **MATH 212** | **Calculus 1** |

**Course Specification:**

**Lectures:**

The current course aims to provide a language for working with ideas relevant to computer science. The course is concerned with two main topics: Differential and Integral Calculus. The 1st topic is covered completely including basic concepts of the function as: Domain, Range, Mathematical Modeling, Composition, Boundness, Equality, Intervals of Increase and Decrease, Piecewise-definition, Symmetry and Homogeneity. Classification, Important types, Graphs and Related Properties, Algebraic Operations on the graph. The Inverse: Conditions and Tests of Existence, Principal Branches, Analytical and Graphical Determination of the inverse. Indeterminate Forms (0\*∞, ∞-∞): Definitions, Concepts, Related Theorems, and Evaluations, Definitions of Continuity and Discontinuity. The Derivatives of all standard functions: Power Function, Trigonometric Function and their Inverse, Hyperbolic Functions and their Inverse, considering : Graph, Domain, Range, Symmetry, and Periodicity. Applications of the Derivatives regarding: General derivatives, Implicit Differentiation, Parametric Differentiation and the Chain Rule, Important theorems as: Roll’s, Mean Value, Maclurin's, Taylor's and L’Hopital Theorems, Geometric applications: Curve tracing, Polar Coordinates, Famous polar curves. The 2nd topic covers all the essential requirements of integral Calculus, starting with Indefinite Standard Integration including all the Basic Concepts and Properties, Notable Remarks, Tables Of Standard Integration (All Elementary Functions), Basic Forms, Various Skills Using Algebraic Relations to obtain different forms of the solution of the same problem. Also, the student will have robust study of Techniques of Evaluation of Indefinite Non-standard Integration: Completing a perfect square, Using Partial Fractions, By Parts, By Substitutions

**Objectives:**

1. Introduces specific tools for analysis and verification and a practical framework for understanding important computing ideas.
2. Furnishes procedures, and processes to describe a mathematical result in everyday terms.
3. Describes and defines mathematical models that explain and express physical phenomenon, chemical reaction, and even commercial, social, and political relations.
4. Constructs algebraic tools that create well developed accurate solutions.
5. Verifies independent critical thinking and problem solving skills.

**Outcomes:**

1. Recognize, indicate and discuss the rate of growth/decay of any relation.
2. Classify, and convert relations from one domain to another to reproduce new adequate form that clearly match a solution.
3. Summarize procedures, processes and describe the mathematical results.
4. Distinguish the importance of the different terms in a given relation.
5. Analyze the problem, plan for the solution, develop the solution(s), and justify these solution(s).
6. Manage and compile the effects of quantities that can never be directly evaluated.
7. Practice how to apply and manipulate carefully the physical or/and geometric conditions on a set of variables to sketch the locus of these variables.
8. Prepare and sketch clear illustrative graphs that demonstrate and measure the behavior of complicated relations with time or/and location(s).
9. Sketch Flowcharts or/and apply Pseudo code to modify computer program(s) that execute the solution(s) of the manipulated problem(s).
10. Acquire teamwork communications skills, e.g. Lead and motivate individuals.
11. Able to work in stressful environment and within constraints.

**Text Book**

David J. Ellenbogen, “Calculus And Its Applications” , Addison Wesley, 2007.

**Essential References**

* James Stewart,"Calculus" ,  Brooks/Cole Publishing Company, 2007.
* Margaret L. Lial, “Calculus with Applications”, Addison-Wesley, 2004.
* James Stewart,"Calculus with Analytic Geometry"**,** Houghton Mifflin Company, 7th Edition, 2002.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **PPHS 128** | **3** | **3** | **-** | **2** | **2** | **PHYS 217** | **Physics 2** |

**Course Specification:**

**Lectures:**

This course includes two parts;

Part A: general physics: Electric fields, Coulomb's law, Gauss' Law, electric potential, capacitance and dielectric, currents and resistance, electrical energy and power, direct current circuits, Kirchhoff's rules, magnetic fields, motion of charged particle in a magnetic field, sources of the magnetic field, Faraday's law of induction, Ampere’s law, mutual inductance, alternating current circuits, the RLC series circuit(a resistor, an inductor, and a capacitor connected in series), power in an A.C. circuit, resonance in RLC services circuit.

Part B Basic Electronics: The P-N junction diode and Zener diode with their applications, Junction Field effect transistor, Bipolar junction transistor (Bias and amplifiers: JFET & BJT).

**Lab:**

Verification of Ohm’s Law, Metric bridge, Charge and discharge of capacitors, Inductive Reactance, Capacitive Reactance, RCL circuits, Transformers, Rectifying circuits.

**Objectives:**

1. Introduces specific tools for analysis and verification and a practical framework for understanding important computing ideas.
2. Furnishes procedures, and processes to describe a mathematical result in everyday terms.
3. Describes and defines mathematical models that explain and express physical phenomenon, chemical reaction, and even commercial, social, and political relations.
4. Constructs algebraic tools that create well developed accurate solutions.
5. Verifies independent critical thinking and problem solving skills.

**Outcomes:**

1. Knowledge of the basic concepts and principles of physics.
2. Analyzing natural phenomena.
3. Understanding and interpreting physically mathematical equations.
4. Expressing mathematically physical problems.
5. Deal with standard instruments.
6. Understanding and operating the basic principles of electronics.

**Text Book**

* David J. Ellenbogen, “Calculus And Its Applications” , Addison Wesley, 2007.

**Essential References**

* James Stewart,"Calculus" ,  Brooks/Cole Publishing Company, 2007.
* Margaret L. Lial, “Calculus with Applications”, Addison-Wesley, 2004.
* James Stewart,"Calculus with Analytic Geometry"**,** Houghton Mifflin Company, 7th Edition, 2002.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **PENG 121** | **3** | **2** | **0** | **0** | **2** | **ENG 210** | **Technical English** |

**Course Specification:**

**Lectures:**

In this course students learn to read various computer science related materials. Use of the internet both for research and communication is an integral part of the course experience. Most of the course activities are student centred and they learn to cooperate with their friends and partners. Also student-teacher interactions become more frequent in the lecture room.

This course will also offer students a broad introduction to English in the context of information Technology assuming a general English base. It is essentially a functional course that builds IT- related vocabulary with a strong emphasis on reading skills, for finding, understanding and utilizing information. Use of the computer dictionary is an essential part of this course.

**Objectives:**

1. Develop students’ language skills in the context of Computing & Information Technology.
2. Help students to develop their IT English skills (reading, writing, speaking, and listening) in the context of IT English.
3. Review and practice basic grammatical structures & general vocabulary.
4. Introducing the students to the basic IT English concepts and vocabulary.
5. Read a range of basic text materials in the area of computers and IT in English. Also, write, organize & present a short written general and technical articles in the area of computers & IT.
6. Using the Internet for academic purposes and pragmatically correct e-mails in English.
7. Be ready for interacting with the new IT trends in English language.
8. In general, the course expects to develop the students' ability to participate in simple exchange of information and opinions in the context of specialism. Also It aims to expand student' proficiency in English for Information Technology.

**Outcomes:**

1. Deploy appropriate grammatical and lexical items in written and spoken communication in the field of Computer Science.
2. Write resumes and business letters in a concise, appropriate and professional manner.
3. Conduct effective interviews to elicit information about the career of their interest.
4. Demonstrate a deeper understanding of the workplace requirements of the career of their interest.
5. Write business proposals to offer computerization solutions in a concise, persuasive and professional manner.

**Textbook:**

* Eric H. Glendinning and John McEwan, "Oxford English for Information Technology", 2006, Oxford University Press, Oxford. Student's Book, ISBN 019457492X.

**Essential References:**

* Eric H. Glendinning and John McEwan, "Basic English for Computing", REVISED EDITION, Oxford University Press, Oxford. Student's Book, ISBN 978-0-19-457470-9
* Keith Boeckner and P Charles Brown, "Oxford English for Computing", Oxford University Press, Oxford. Student's Book, ISBN 978-0-19-457470-0
* "Oxford Dictionary of Computing for Learners of English", 1996, Oxford University Press, Oxford. ISBN 978-0-19-431441-1.

# Courses Description

**Level 4**

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| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** |
| CSI 211 | 3 | 0 | 2 | 2 | Programming 2 | CSI 221 |
| CSI 212 | 2 | 0 | 0 | 2 | Disc. Math For CS 2 | CSI 222 |
| MATH 212 | 3 | 1 | 0 | 3 | Calculus 2 | MATH 220 |
| PHYS 217 | 3 | 0 | 2 | 2 | Dig. Logic Design | CSI 223 |
| --- | 3 | 0 | 0 | 3 | Fund. of Inf. Systems | CSI 224 |
| --- | 2 | 0 | 0 | 2 | General Chemistry | CHEM 225 |
|  | **16** | | | | **Total** | |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 111** | **4** | **3** | **0** | **2** | **2** | **CSI 121** | **Programming 2** |

**Course Specification:**

**Lectures:**

This course is an introductory course in object oriented programming. The fundamental concepts of object oriented programming will be studied using the C++ programming language. Topics to be covered: Functions - Classes and Objects - Inheritance – Polymorphism – Operator Overloading - File processing and Streams.

**Lab:**

C++ Review ( 2 weeks) - Functions and Procedures (2 weeks) - Arrays ( 2 weeks) - Pointers (2 weeks) - Class ( 2 weeks) – Polymorphism ( 2 week) – Overloading ( 2 week).

**Objectives:**

1. Describe the basic concepts of Object Oriented Programming.
2. List the benefits of OOP over traditional structured programming
3. Enable student to master the C++ implementation of object-oriented concepts including:
   * Encapsulation
   * Information hiding
   * Data abstraction .
   * Inheritance hierarchies.
   * Polymorphism
   * Function overloading
4. Develop object-oriented programs in C++.

**Outcomes:**

1. Understand the basic OO programming concepts.
2. Compare the OO programming approach against the traditional approach.
3. Identify the main objects/classes, methods, attributes from given problem specifications.
4. Design and code small to medium sized problems from the start using the appropriate OO concepts and other concepts introduced (class, inheritance, polymorphism, generic programming etc.)
5. Create and manipulate Files using the available I/O file streams classes.
6. Contribute to a group effort to realize an OOP based solution

**Textbook and References:**

**Text Book:**

C++: How To Program, Deitel and Deitel,, Prentice Hall, ISBN 978-007351725, 2010.

**Essential References:**

C++ Programming: From Problem Analysis to Program Design,De D. S. Malik, Course Technology,, 2006

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 212** | **4** | **0** | **0** | **0** | **2** | | **CSI 222** | **Discrete Mathematics of Computer Science (2)** |

**Contents:**

**Lectures:**

This course covers the mathematical topics that are mostly directed to computer science. Students may need them in courses like cryptography, compiler, and programming design. Topics include: Introduction to number theory, concepts of abstract algebra, and formal languages - Number Theory: Divisibility and Euclidean algorithms. Modular arithmetic, Fermat's and Euler's theorems, Chinese remainder theorem - Concepts of Abstract Algebra: groups, rings, fields, Homomorphism, Lagrange's theorem, Finite fields - Automata Theory: Finite state machine, Regular expressions, DFA, NDFA, and their equivalence, Grammars and Chomsky hierarchy.

**Lab:**

Implementation of some problems like division algorithm, Euclidean algorithm, Finite state machine, and Grammars.

**Objectives:**

1. Apply topics of number theory in computer science.
2. Describe the abstract algebra concepts like groups, rings, and fields.
3. provide the use of finite fields and their applications.
4. Explain the use of formal languages in computer science.

**Outcomes:**

1. Be able to distinguish among properties of numbers.
2. Be able to define and apply the concept of groups, rings, and fields.
3. Be able to define the finite state machine, DFA, NDFA, and Turing

**References**

1. Kenneth H. Rosen : Discrete Mathematics and Its Applications, 2011, McGraw-Hill College.
2. Edwin Clark, Elementary of Number Theory, Dept. of Mathematics, University of South Florida, 2003, Open Source Book.
3. Michael Sipser, “Introduction to the Theory of Computation”, Cengage Learning publisher, 3rd edition, 2012.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **MATH 112** | **4** | **3** | **1** | **0** | **3** | **MATH 220** | **Calculus 2** |

**Course Specification:**

**Lectures:**

The current course aims to abstract the essentials of problems and formulate them mathematically and in symbolic form so as to facilitate their analysis and solution. The 1st topic is The definite integration: Introduction & Basic Concepts and Properties of Definite Integrals, Theorems Facilitating Evaluation of Definite Integrals, Improper Integrals of First And Second Kinds, Case Study: Special Functions Defined As Definite Integrals. Applications of definite integration: Using Cartesian, Parametric, and Polar coordinates in: Area between two curves, Length of plan curves. The 2nd topic is The Partial Differentiation: Basic Concepts: of Functions of several variables, Partial derivatives of order one and higher orders, Chain rule for one parameter and more. Applications: Rates, Exact differential expression, Del operator: Gradient & Divergence & Curl. The 3rd topic is The Analytic Geometry: Two Dimensions: The different forms of equations of straight line, The conic sections: equations and geometric properties. Three Dimensions: The Cartesian, Cylindrical, and Spherical Coordinates and their interrelations. The Directional Cosines and Ratios. The Plane, The Straight Line, The Quadric Surfaces. The 4th topic is The Multiple Integral and Vector Calculus: Double Integral: The Cartesian coordinates, Change of order, Polar coordinates. Line Integral: Opened/Closed paths in different coordinate systems. Green’s Theorem, Path independence. The 5th topic is The sequences and Infinite Series: Definition: Sequence, Series, Convergence, Divergence. Tests for Convergence And Divergence For Positive Series: Nth term test, Polynomial test, Comparison test, Nth root test, Ratio test, Integral test. Alternating Series: Leibnitz theorem for Absolute and conditional convergence. Power Series: Formation, Interval of convergence.

**Objectives:**

1. Use the manipulative and analytical skills to solve word problems.
2. The ability to select and apply appropriate mathematical processes.
3. Constructs algebraic tools that create well developed accurate solutions.
4. Verifies independent critical thinking and problem solving skills.

**Outcomes:**

1. Understand the concept of integration and its application to physical problems such as evaluation of areas, volumes of revolution, force, and work; fundamental formulas and various techniques of integration applied to both single variable and multi- variable functions; tracing of functions of two variables.
2. Sketch 3-dimensional regions bounded by several surfaces; and evaluate volumes of 3-dimensional regions bounded by two or more surfaces through the use of the double integral.
3. Determine the indicated sum of the elements in special sequences and series, and recognize the convergence/divergence of general sequence and series.
4. The ability to present mathematical arguments and conclusions from them with clarity and accuracy, in forms suitable for the audiences being addressed.
5. Correctly apply the formulae and techniques of integration, partial differentiation, and linear algebra in solving practical problems.
6. Manage and compile the effects of quantities that can never be directly evaluated.
7. Practice how to apply and manipulate carefully the physical or/and geometric conditions on a set of variables to sketch the locus of these variables.
8. Prepare and sketch clear illustrative graphs that demonstrate and measure the behavior of complicated relations with time or/and location(s).
9. Acquire teamwork communications skills, e.g. Lead and motivate individuals.
10. Work in stressful environment and within constraints

**Text Book:**

* Soo T. Tan, “Calculus”, Books/Cole Cengage Learning, 2010.

**Essential References:**

* Robert T. Smith, "Calculus", McGraw Hill, 3rd Edition, 2009.
* K. A. Stroud, “Engineering Mathematics”, Palgrave Macmillan, 6th Edition, 2007.
* R. Larson, "Calculus with Analytic Geometry"**,** Houghton Mifflin Company, 7th Edition, 2002.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **PHYS 217** | **4** | **Credit** | **Ex** | **Lab** | **Lecture** | **CSI 223** | **Digital Logic Design** |
| **3** | **0** | **2** | **2** |

**Contents:**

**Lectures:**

The course provides students with basic knowledge in: Binary Numbers, Octal and Hexadecimal Numbers, Number Base Conversions, Complements, Signed Binary Numbers, Binary Codes; Boolean Algebra and Logic Gates, Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms. Digital Logic Gates, Integrated Circuits, Transistor equivalent of Digital Logic Gates; Gate-Level Minimization, The Map Method, Four-Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function; Combinational Logic, Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers; Sequential circuits: Latches and Flip flops, Sequential circuits analysis and design, Finite state machines, Registers and Counters.

**Lab:**

Truth table of 2-input AND Gate, OR Gate, NAND Gate, NOR Gate, truth table of 3-input AND gate, OR gate, NAND Gate, NOR Gate, Truth table of Inverter, Changing OR Gate to AND Gate using an inverter and inversely AND Gate to OR Gate, Truth table of 2-input X-OR Gate, truth table of 3-input X-OR gate, Truth table of 2-input X-NOR Gate, truth table of 3-input X-NOR gate, Obtaining X-OR Gate using NAND Gate, Circuit Design with KARNAUGH Maps, TRI-STATE BUFFER, RS FLIP-FLOP, Obtaining RS FLIP-FLOP with NAND Gate, Obtaining RS FLIP-FLOP with NOR Gate, RS FLIP-FLOP, J-K FLIP-FLOP, D FLIP-FLOP, T FLIP-FLOP.

**Objectives:**

Course objectives are the long-term goals set for students who take this course. For students to:

* 1. Understand how logic circuits are used to solve engineering problems.
  2. Understand how logic circuits are analyzed, designed, verified, and tested.
  3. Understand the relationship between abstract logic characterizations and practical electrical implementations.

**Outcomes:**

 After taking this course students will be able to recognize and use the following concepts, ideas, and/or tools:

* 1. **Logic level models**, including Boolean algebra, finite state machines, arithmetic circuits, and hardware description languages.
  2. **Logic gates, memory**, including CMOS gates, flip-flops, arrays, and programmable logic.
  3. **Design tools**, both manual and computerized, for design, optimization, and test of logic circuits.
  4. **Design criteria**, including area, speed, power consumption, and testability.

**Text Book:**

* M. Morris Mano &Michael D. Ciletti:Logic Design with an Introduction to the Verilog HDL, 5th Ed. 2013, Pearson Education.

**Essential References:**

* J. Wakerly, Digital Design: Principles and Practices, 2000, Prentice-Hall
* C. H. Roth, Fundamentals of Logic Design, 2004**,** Thomson Brooks / Cole

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **---** | **4** | **Credit** | **Ex** | **Lab** | **Lecture** | **CSI 224** | **Fundamentals of Information Systems** |
| **3** | **0** | **0** | **3** |

**Course Specification:**

**Lectures:**

The current course furnishes an overview of the fundamentals of data and information processing as they relate to meeting the needs of an organization in immediate and long run operations. Also, it provides an understanding of how information systems are used in organizations. These objectives can be successfully achieved through the conduction of the following topics: Basic Concepts of systems: What is it? Why we need it? How it is constructed? When and where it is used? Components of information systems, levels and types of information systems, important illustrative examples of real-life practical information systems: DSS, ERP, Expert Systems, GUI, and Internet portals, and introduction to Database.

**Lab:** non

**Objectives:**

1. To Introduce the fundamentals of data and information processing as they relate to meet the needs of an organization in immediate and long run operations.
2. To Recognize the design and implementation aspects of large-scale information systems as well as the more traditional managerial and organizational issues..
3. To introduce an overview of theory, practice and technology of information
4. systems with a managerial perspective to afford students with an understanding of how are information systems used in organizations.
5. To introduce the basic concepts of Database.

**Outcomes:**

1. To acquire the ingredients of management knowledge necessary for success in the management of information technology.
2. To Recognize and analyze ethical problems in organizational situations and select and defend a course of action.
3. To Apply critical thinking and problem-solving skills when analyzing and solving information system and business problems.
4. To Develop skills through research in IS literature that will prepare them for life-long learning in the field.
5. To Understand the individual and group dynamics of project teams.

**Text Book:**

O'Brien and MaraKas, George Marakas ; Introduction to Information Systems (16th  Ed.) McGraw Hill, Business and Economics, 2012.

**Essential References:**

* V. Rajaman; Analysis and Design of Information Systems; 2nd  Edition; PHI Learning Pvt Ltd; Aug. 2004.
* Ralph Stair and George Reynolds, “Fundamentals of Information Systems”, Course Technology, 3rd Edition 2005, ISBN 1423901134.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **---** | **4** | **Credit** | **Ex** | **Lab** | **Lecture** | **CHEM 225** | **General Chemistry** |
| **2** | **0** | **0** | **2** |

**Course Specification:**

**Lectures:**

General chemistry course should be studied in the first levels. It describes atomic theory, chemical bonding, chemical reactions, gases, liquids, chemical equilibrium, thermochemistry and chemical kinetics.

**Lab:** Non.

**Objectives:**

1. Atomic theory
2. Chemical bonding
3. Chemical reactions
4. Gases
5. Liquids
6. Chemical equilibrium
7. Thermochemistry.
8. Chemical kinetics

**Outcomes:**

1. Know the basic structure of the atom and atomic theories and various electronic distribution of elements
2. Identify the different types of chemical bonds
3. Identify the different chemical reactions
4. A gaseous state study of materials and
5. various laws of gases
6. The study of the different types of solutions and their properties and to identify the acids and alkalis and their relationship to the number of acidity
7. The study of chemical equilibrium in adverse reactions and study the effect of common ION and holds melting
8. To identify the thermal interactions and how to measure the amount of heat absorbed or released from interaction and study the laws of thermodynamics and its relation to energy and chemical equilibrium.
9. Ranking of chemical reactions and how to measure the speed of the various interactions and the half-life as well as the effect of temperature on the constants rates.

**Text Book:**

* Thomson, Principles of modern Chemistry, 6thed, 2008.

**Essential References:**

* Peter Atkins and Julio de Paula, The Elements of Physical Chemistry, 2005.
* Peter Atkins and Julio de Paula, Physical Chemistry, 2006.
* Robert J. Silbey, Robert A. Alberty, and Moungi G. Bawendi, Physical Chemistry, 2004.

# Courses Description

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| --- | --- | --- | --- | --- | --- | --- |
| **requisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** |
| CSI 221 | 3 | 0 | 2 | 2 | Visual Programming | CSI 311 |
| CSI 221, CSI 212 | 3 | 0 | 2 | 2 | Data Structure | CSI 312 |
| CSI 223 | 3 | 0 | 2 | 2 | Computer Organization and Assembly Language | CSI 313 |
| CSI 211 | 3 | 0 | 2 | 2 | Database | CSI 314 |
| Math 220 | 3 | 1 | 0 | 3 | Linear Alg. & Diff. Eq. | MATH 310 |
| -- | 2 | 0 | 0 | 2 | Elective Islamic Course 1 | ISL \*\*\* |
|  | **17** | | | | **Total** | |

**Level 5**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CIS 153** | **4** | **4** | **0** | **2** | **3** | **CIS 224** | **Visual Programming** |

**Course Specification:**

**Lectures:**

This course offers comprehensive coverage of C#, explaining the core of the language including the basics of LINQ vocabulary (Language Integrated Query). You gain fundamental experience in how C# is used as part of the .NET Framework, including: 1-language fundamentals: data types and control constructs, defining and calling methods, and employing .NET library classes. 2- Developing C# Classes: defining classes, and creating and using objects. 3-Interconnecting Objects: associating classes, and exposing interfaces.

**Lab:**

Visual Studio2012 : an Introduction (1 Week) – Visual C# Fundamentals (1 Week) – Branching and Looping (2 Weeks) – Visual C# Control Fundamentals (4 Weeks) – Menus and Dialog Boxes (3 Weeks)- Executing and Debugging (3 Weeks) – Procedures (2 Weeks).

**Objectives:**

1. The C# language is intended to be a simple, modern, general-purpose, object-oriented programming language.
2. The language is intended for use in developing software components suitable for deployment in distributed environments.
3. Source code portability is very important, as is programmer portability, especially for those programmers already familiar with C and C++.
4. C# is intended to be suitable for writing applications for both hosted and embedded systems, ranging from the very large that use sophisticated operating systems, down to the very small having dedicated functions.
5. Windows applications developers who plan to use C# for stand alone desktop or client/server programs
6. Web programmers wishing to apply this new language in thin-client server-side applications
7. Enterprise developers who plan to use C# in broadly distributed database applications

**Outcomes:**

1. Using C# data types, class libraries and control constructs
2. Building C# classes and inheritance hierarchies
3. Writing GUI applications using the drag-and-drop facilities
4. Writing and deploying components in an ASP.NET Web application

**Text Book:**

“Programming C# Building .Net Applications with C#”; Jesse Liberty; O'Reilly Media; 4th Ed. 2009.

**Essential References:**

“Remoting in C# and .NET”; Dr. Richard Wiener, ETH Zurich, Chair of Software Engineering; Vol. 3(4), 2004.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 221, CSI 212** | **5** | **3** | **0** | **2** | **2** | **CSI 312** | **Data Structures** |

**Course Specification:**

**Lectures:**

This course introduces the basic theories and methodologies of data Structure. It is organized to provide a pedagogical path that starts with the basics of C++ programming and object-oriented design based on concrete structures, like arrays and linked lists, in order to provide a concrete footing to build upon when constructing other data structures. Then add foundational techniques like recursion and algorithm analysis, and, in the main portion of the course, we present fundamental data structures and algorithms, concluding with a discussion of memory management (that is, the architectural underpinnings of data structures). Specifically, the chapters for this course are organized as follows: Arrays, Linked Lists, and Recursion , Analysis Tools, and Stacks, Queues, and Deques , and List and Iterator ADTs, Trees, Heaps and Priority Queues , Hash Tables, Maps, and Skip Lists , Search Trees , Sorting, Sets, and Selection ,Strings and Dynamic Programming.

**Lab:**

To teach the student popular data mining tools such as WEKA: Basics of C++ programming and object-oriented design (2 Weeks) - Arrays, Linked Lists, and Recursion (2 Week) - Analysis Tools, and Stacks, Queues, and Deques (2 Weeks) - and List and Iterator ADTs, Trees, Heaps and Priority Queues (2 Weeks) - , Hash Tables, Maps, and Skip Lists (2 Weeks) - Search Trees (2 Weeks). Sorting, Sets, and Selection (2 Weeks) . and Selection ,Strings and Dynamic Programming (2 Weeks).

**Objectives:**

1. Cover the use of primitive data types and built-in data structures.
2. Write programs that use each of the following data structures: arrays, strings, linked lists, stacks, queues, and hash tables
3. Discuss the importance of algorithms in the problem-solving process.
4. Compare alternative implementations of data structures with respect to performance.
5. Identify the necessary properties of good algorithms.
6. Create algorithms for solving simple problems
7. Distinguish and contrast the costs and benefits of dynamic and static data structure implementations.
8. Use pseudocode or a programming language to implement, test, and debug algorithms for solving simple problems
9. Choose the appropriate data structure for modeling a given problem.
10. understand the use of big O, omega, and theta notation to give asymptotic upper, lower, and tight bounds on time and space complexity of algorithms.

**Outcomes:**

1. Be familiar with basic data structure of algorithms.
2. Be familiar with writing recursive methods by using C++.
3. Master the implementation of linked data structures such as linked lists and binary trees.
4. Be familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure
5. Be familiar with several searching and sorting algorithms including quicksort, Merge-Sort and Heap-Sort.
6. Be familiar with some graph algorithms such as shortest path and minimum spanning tree
7. Master the standard data structure library of a major programming language (e.g. in C++)
8. Master analysing problems and writing program solutions to problems using the above techniques

**Text Book:**

* Michael T. Goodrich, Data Structures and Algorithms in C++ ,Second Edition - 2011.

**Essential References:**

* Clifford Shaffer, A practical Introduction to Data Structures and Algorithm Analysis, 2nd Ed. , Prentice Hall, 2001
* A.V. Aho,J.E. Hopcroft and J. D. Ullman, Data Structure and Algorithms. Reading , MA: Addison-Wesley,1983.
  + - * Larry Nyhoff, ADTs, Data Structures and Problem Solving with C++, 2nd Ed. , Printice Hall, 2005.
* Malik, Data Structures using C++, Thomson , 2003.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 223** | **5** | **3** | **0** | **2** | **2** | **CSI 313** | **Computer Organization and Assembly Language** |

**Course Specification:**

**Lectures:**

This course introduces topics related to computer organization and architecture in two paradigms: "what", and "how". To answer “what”, the course presents the fundamental principles of computer organization and architecture. This leads to an understanding of the design of processors, the structure and operation of memory and virtual memory, cache, storage, and pipelining, system integration, and peripherals. The course also provides an introduction to issues of system performance evaluation and the relationship of architecture to system software. Regarding the “how”, the course provides basic programming in assembly language. This leads to a direct and practical understanding of the inner working stages of a processor in relation to the rest of the system, including memory and cache management, interrupt processing and pipelining. Execution of software via assembly language and high level languages is explained in terms of system software tools which include assemblers, compilers, linkers, and loaders.

**Lab:**

Introduction to the 8086 kit(1 week), introduction to the Emu 8086 program(1 week), writing the first assembly program(1 week), performing input and output instruction using the 8086 kit and the emu 8086 program (2 weeks), writing programs to apply the arithmetic operations (2 weeks), writing program to apply the comparison statements and loop(4 week) and finally prepare a small project that cover all the previous topics (3 weeks).

**Objectives:**

1. To explain what operating systems are, what they do, and how are they evolved, designed, and constructed.
2. To understand the process concept and concurrency as the heart of modern operating systems.
3. To compare and contrast the common CPU scheduling algorithms used for both preemptive and non-preemptive scheduling of tasks in operating systems, such as priority, performance comparison, and fair-share schemes.
4. To understand the concept of process synchronization and to explain the concept of algorithms used to prevent, avoid, and detect deadlocks.
5. ٔTo explain the concept of memory management and how it is realized in hardware and software.
6. To explain the concept of virtual memory.
7. To explain, compare and contrast the common disk scheduling algorithms.

**Outcomes:**

1. Know basic terms associated with operating systems, such as Short-Term Scheduler, Long-Term Scheduler, Multiprogramming, Multiprocessors, etc. and know the structure of the operating system.
2. Know the processes’ states and state diagrams.
3. Know how to design several CPU scheduling and identify their performance.
4. Know how to synchronize processes using semaphores and know how to solve deadlocks using different methods.
5. Know different schemes of memory management such as paging, segmentation, and segmentation with paging, and identify their performance.
6. Know how to design different Page-Replacement algorithms and identify their performance.
7. Know how to design different Disk scheduling algorithms and identify their performance.
8. Know the advantages and disadvantages of different interconnection network topologies.

**Text Book:**

* William Stallings, Computer Organization and Architecture: Designing for Performance, 9th Edition, Prentice Hall, 2012

**Essential References:**

* Mazidi, Muhammad Ali, and Janice Mazidi. 80x86 IBM PC and Compatible Computers: Assembly Language, Design and Interfacing. Prentice Hall PTR, 2000.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 211** | **6** | **3** | **0** | **2** | **2** | **CSI 314** | **Database** |

**Course Specification:**

**Lectures:**

This course aims to discuss the basic concepts and design of database. It covers topics such as: data model, levels of abstraction, data independence, and concurrency control. Focuses on how to design databases for given problems, and how to use database effectively, these including ER model, key and participation constraints, weak entities, class hierarchies, aggregation and conceptual DB design using the ER model. Relational model: creating and modifying relation using query language, enforcing integrity constrains, ER to relational and view. Schema refinement and normal forms: Functional dependencies, reasoning about functional dependencies, normal forms, decompositions and normalization. Relational   Queries: Relation algebra and calculus and commercial query languages. Object database systems: User defined abstract data type, structured types, objects; object identity; and reference type, inheritance, and database design for an ORDBMS. Students will be trained on some software tools such as: Oracle, Sybase, DB2, and Informix.

**Lab:**

DDL, Data Definition, Table Creation, Constraints - DML, Insert, Select Commands, Update and Delete Commands - Nested Queries and Join Queries - Views data - High level programming language extensions (Control structures, Procedures and Functions) - Front end Tools – Forms – Triggers - Menu Design – Reports - Database Design and implementation (Mini Project).

**Objectives:**

1. Learn the fundamental database concepts and systems methodologies to design database systems. (10%)
2. Understand data modeling using ER Model and EER Model and the mappings to relational model (25%)
3. Understand relational database model and database creation using the spcified DBMS in DB lab (25%)
4. Understand Relational Algebra and Structured Query Language (25%)
5. Understand functional dependencies and database normalization (15%).

**Outcomes:**

Define program-data independence, data models for database systems, database schema and database instances.

1. Recall Relational Algebra concepts, and use it to translate queries to Relational Algebra statements and vice versa.
2. Identify Structure Query Language statements used in creation and manipulation of database.
3. Define functional dependencies and normalization concepts.
4. Identify the methodology of conceptual modeling through Entity Relationship model.
5. Identify the methodology of logical model.
6. Identify the methodology of physical model.
7. Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach.
8. Analyze and design a real database application.
9. Develop and evaluate a real database application using a database management system.

**Text Book:**

Elmasri, R., Navath,S., and Navath, B.,"Fundamentals of  Database Systems" ,  Addison-Wesley, 6th  Ed., 2010, ISBN 0136086209.

**Essential References:**

* Raghu, R. and  Johannes, G., “Database Management Systems” , McGraw- Hill,3rd   ed., 2002,ISBN 0072465638.
* Date, C. J., “Introduction Database Systems”, Addison-Wesley, 8th ed.,2003,      ISBN 0321197844.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **MATH 220** | **5** | **3** | **1** | **0** | **3** | **MATH 310** | **Linear Algebra and Differential Equations** |

**Course Specification:**

**Lectures:**

The course has two basic tracks. The 1st track is concerned with the Linear Algebra where the student will study the theory and applications of arrays, mainly vectors and matrices through the subjects: Basic Concepts of Arrays, Important frequent types of matrices, Echelon Form, Important algebraic operations on matrices, , the Model matrix; Orthogonal, Orthonormal, and Unitary matrices. Diagonalization, and Similarity properties, Caley\_Hamilton theorem and its Applications, The minimal polynomial. Functions of matrices, Positive and negative definite matrices. The 2nd Track is devoted for the Differential Equations: Basic Concepts: First Order and First Degree Differential Equations: Separable & reducible to separable, Homogeneous & reducible to homogeneous, Exact & reducible to exact (integrating factor), Linear & reducible to linear (Bernoulli), High Order and First Degree Differential Equations: (with constant coefficients): Independent Solutions and the Wronskian, D-operator & Inverse D-operator, Method of undetermined coefficients, Complementary and Particular solutions, Simultaneous high order differential equations, Shift rule and its application for the particular solution.

**Lab:**

Non.

**Objectives:**

1. Offers a range of ways for the students to develop their skills and knowledge.
2. Introduces several specialized areas of mathematics and its applications.
3. Enables the students to examine how the principal results are related to real-world problems.
4. Operate and manipulate matrices and determinants; and solve systems of linear equations using matrices and determinants.

**Outcomes:**

1. Analysis and determination of the general solution of linear systems of equations.
2. Modeling and Simplifying real life complicated systems.
3. Presenting mathematical arguments and conclusions with clarity and accuracy.
4. To learn independently.
5. Effective communications and presentation orally.
6. Think critically about solutions and to defend an intellectual position.
7. Grasp how mathematical processes may be applied to problems including an understanding that might give only a partial solution.
8. Demonstrate Knowledge of key mathematical concepts and topics, both explicitly and by applying them to the solution of problems.
9. Sketch Flowcharts or/and apply Pseudo code to modify computer program(s) that execute the solution(s) of the manipulated problem(s).
10. Acquire teamwork communications skills, e.g. Lead and motivate individuals.
11. Work in stressful environment and within constraints
12. Formulate proofs and construct counterexamples

**Text Book:**

* Peter J. Oliver, “Applied Linear Algebra” , Prentice Hall, 2006.
* James R. Brannan, “Differential Equations with Boundary Value Problems” , John Wiley & Sons, 2010.

**Essential References:**

* D. W. Jordan**,** “Mathematical Techniques: An Introduction for the Engineering, Physical, and mathematical Sciences”, Oxford University Press**,** 2002**.**

# Courses Description

**Level 6**

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| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** |
| CSI 312 | 3 | 2 | 0 | 2 | Design & Analysis of Algorithms | CSI 321 |
| CSI 224 | 3 | 0 | 2 | 2 | Computer Networks | CSI 322 |
| CSI 313 | 3 | 0 | 1 | 3 | Computer Architecture | CSI 323 |
| CSI 314 | 3 | 0 | 4 | 1 | Advanced Database | CSI 324 |
| CSI 221 | 3 | 0 | 2 | 2 | Software Engineering 1 | CSI 325 |
| MATH 212 | 3 | 1 | 0 | 3 | Probability & Statistics | STAT 320 |
|  | **18** | | | | **Total** | |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 312** | **6** | **3** | **0** | **2** | **2** | **CSI 321** | **Analysis and Design of Algorithms** |

**Contents:**

**Lectures:**

This course is continuing to provide students with the ability to select algorithms appropriate to particular purpose and to apply them, recognizing the possibility that no suitable algorithm may exist. This relies on understanding the range of algorithms that address an important set of well-defined problems, recognizing their strengths and weaknesses, and their suitability in particular contexts. Efficiency is a pervasive theme throughout this area. A new range of paradigms and techniques to design algorithms and to solve problems is considered: Review of Basic Analysis - Algorithms strategies - Solving Recursions - Sorting and Searching: Insertion sort, Selection sort, Bubble sort, Merge Sort, Quick sort, linear search, Binary search - Dynamic Programming - Advanced data structures – and Graph Algorithms.

**Lab:**

Students should implement every algorithm shown above using C++ language.

**Objectives:**

1. To create analytical skills, to enable the students to design and analysis algorithms for various applications.
2. To apply design techniques to numeric and nonnumeric algorithms which act on data structures.
3. To study methods those are used to predict the resources needed by an algorithm. Specific attention is paid to worst case running time. Average-case running time is also considered.
4. To gain the ability to efficiently select the suitable data structures for various algorithms.

**Outcomes:**

1. able to understand fundamental computer algorithms: how to design analyze them.
2. able to describe how to show the correctness of an algorithm
3. able to understand and apply the basic paradigms for designing an algorithm.
4. able to use the mathematical techniques required to prove the time complexity of a program/algorithm.
5. able to use, compare and analyze the primary sorting and searching algorithms
6. able to understand and use the graph algorithms: searching, shortest paths, minimum spanning tree

.**References**

1. Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein, Introduction to Algorithms, MIT Press, 2009.
2. Michael T. Goodrich and Roberto Tamassia,Algorithm Design: Foundation , Analysis, and Internet Examples**,** John Wiley & Sons Inc, 2002.
3. M. Goodrich, R. Tamassia, and D. Mount, Data Structures & Algorithms in C++, John Wiley& Sons, 2011.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 224** | **6** | **3** | **0** | **2** | **2** | **CSI 322** | **Computer networks** |

**Contents:**

**Lectures:**

This course is an introduction to computer networks, stressing the logical organization of the three networking features architecture, algorithms, and implementations with focus on performance. Topics include:

* Introduction: overview of computer networks
* Fundamentals of data transmission: wired/wireless media, digital vs. analog transmission, data coding.
* Multi-user communication and multiplexing

LAN technology and data link protocols: point-to-point links and sliding window flow control, Ethernet and CSMA/CD, switched and carrier Ethernet, Wireless LAN and CSMA/CA, cellular networks and advanced multi-user communication.

**Lab:**

know the main devices in building and connecting LAN(2 weeks), building a peer to peer network(3 weeks). The preparing of UTP cable (2 weeks). know how to manage the local LAN on windows environment using windows 7 (3), connecting two networks together (1 week), building client server network(2 weeks) and introduction to windows 2003 server (1 week).

**Objectives:**

1. Introduce fundamental concepts in the design and implementation of computer networks and the protocols.
2. Understanding the concepts and the engineering trade-offs involved in the design of the protocols.
3. Learn about computer networks, why they have been designed the way they are, and how they are going to evolve in the future.
4. To improve understanding of the concepts, several multi-week projects including design and implementation are to be assigned.

**Outcomes:**

1. Discuss the unified view of the field of computer communications.
2. Discuss various communications architectures and protocols.
3. Understand several communications models including the Open Systems Interconnection (OSI).
4. Understand the functioning of several Local Area Networks like Windows peer-to-peer networks and Windows Client-Server. Connect computers in a local area network.
5. Work in a Windows peer-to-peer network environment.
6. Use the Internet as an example of a WAN. Be comfortable with the vast array of terms and concepts in data networking.

**Textbook and References:**

**Text Book:**

1. Computer Networks 5th Ed. Andrew S. Tanenbaum, Pearson Prentice Hall, 2010

**Essential References:**

1. Data and Computer Communication 9th Ed., William Stallings. Pearson Prentice Hall, 2011.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 313** | **6** | **3** | **0** | **1** | **3** | **CSI 323** | **Computer Architecture** |

**Contents:**

**Theoretical part:**

This course provides students with basic knowledge in: Fundamentals of computer design, Performance evaluation, Instruction set principles, Processor organization and design, Pipelining, Instruction and arithmetic pipelines, Dynamic and speculative execution, Precise exception, CISCS, RISC, and VLIW processors, Memory Hierarchy, Virtual memory, Multilevel caches, Storage and I/O, Introduction to Multicore, multiprocessors, and clusters, New trends in computer architecture.

**Lab:**

Performance evaluation. Amdahl’s law - Instruction set measurements - Pipelined design - Instruction pipeline design - Programming pipelined computers - Dynamic scheduling - Speculation.

**Objectives:**

1. To provide the concepts hardware design and operation of digital computer.
2. To teach the students the principles of computer architecture and give understanding of the principles of operation of computers and peripheral devices.
3. To develop an appreciation of why computers are constructed as they are and to study the trade-offs between cost and performance in computer design.
4. To provide an introduction to computer processor and memory architectures, and to the design of personal computer systems.
5. To provide an understanding of the architectural features of modern high performance computers.

**Outcomes:**

1. Define the basic blocks of a computing system
2. Explain the functionality and connectivity of each block
3. Interpret the machine code and corresponding executing units
4. Recognize the performance of a computer
5. Compare the design and instruction set architecture of different processors
6. Recognize the multiprocessor systems

**Textbook and References:**

**Text Book:**

* William Stallings, Computer Organization and Architecture: Designing for Performance, 9th Edition, Prentice Hall, 2012

**Essential References:**

* M. Morris Mano, Computer System Architecture, 2nd Custom Edition, Pearson, 2005.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 214** | **6** | **3** | **0** | **2** | **2** | **CSI 341** | **Advanced Data Base** |

**Course Specification:**

**Lectures:**

This course introduces the concepts and principles of database management systems (DBMS). It focuses on terminology and fundamental concepts of relational databases and database management systems. Students will learn SQL and PL/SQL including, triggers and transaction processing. They will understand performance issues and optimization strategies through query rewriting, secondary storage characteristics, and access strategies. This course also exposes student to some of the current challenges facing database professionals (e.g. semi-structured data management, XML databases, information extraction, data integration) as well as some DBMS design and management issues. Major topics include: Transaction management - Recovery, concurrency control - PL/SQL Programming - Indexing and Hashing - Parallel Databases, Distributed Databases - File organization and access - Buffer management - Performance analysis and storage management - Database system architecture - Query processing and optimization, Reliability, protection, and integrity.

**Lab:**

Create Tables (2 weeks) – Relational tables ( 2 weeks) – advanced SQL (4 weeks) – create users ( 2 weeks) – composed queries ( 4 weeks) – functions and procedures ( 2 weeks).

**Objectives:**

1. Designing methodology for databases and verifying their structural correctness
2. Implementing databases and applications software primarily in the relational model
3. Using querying languages such SQL and other database supporting software
4. Applying the theory behind various database models and query languages
5. Implementing security and integrity policies relating to databases
6. Working in group settings to design and implement larger programming projects

**Outcomes:**

1. Describe advanced database concepts.
2. Define the concept of transactions and describe fundamental transaction processing, concurrency and recovery control issues associated with database management systems.
3. Design and implement complex databases schemas using ER diagrams, normalization, integrity constraints, and advanced database system features such as stored procedures and triggers.
4. Use PL/SQL programming with DBMS
5. Develop database applications using database client APIs such as embedded SQL, ODBC, and JDBC.
6. Describe basic concepts regarding database security and authorization.
7. Gain experience with the use of a commercial relational database product.

**Text Book:**

Database System Concepts, 5th edition ,Silberschatz, Korth, and Sudarshan, McGraw-Hill,2005.

**Essential References:**

Fundamentals of Database Systems,6th edition , Ramez Elmasri,Shamkant Navathe **,** 2010.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 221** | **6** | **3** | **0** | **2** | **2** | **CSI 325** | **Software Engineering 1** |

**Course Specification:**

**Lectures:**

The main objective of this course is to provide students with an overall foundation of software engineering to effectively and efficiently design and implement function-oriented systems. Topics to be covered include: software development life cycle models, system analysis, system development tools, cost benefit analysis, system planning and selection, requirements engineering, system design strategies, designing human interface, rapid application development and CASE tools for function-oriented systems, and system testing, operation and maintenance.

**Lab:**

Function-oriented task management using suitable CASE tools (e. g. MS Project) (4 weeks) – Writing SRS (Software Requirements Specification) document for function-oriented systems using suitable CASE tools (3 weeks) - Writing SDS (Software Design Specification) document for function-oriented systems using CASE tools (3 weeks) – JAD sessions for function-oriented systems (2 weeks) - using CASE tools in the auto-generation of function-oriented code (2 weeks).

**Objectives:**

1. To explain the system development life cycle (SDLC) methodology that allows for a logical progression of topics, and some other methodologies like Agile methodology.
2. To explain the process of managing an information system project, and how the commercial packages can be used to assist in representing and managing the project schedules, skill may be needed to accomplish the process.
3. To explain the skills and concepts that are applied throughout the development, including system concepts and project management.

**Outcomes:**

1. Should be able to know basic terms associated with system and system analysis, such terms are SDLC System Development Life Cycle and System Thinking.
2. Should be able to understand the phases of the life cycle of a system, and what activities performed in each phase.
3. Understand the process of managing information system project.
4. Should be able to learn the skilled needed by a System Analyst to be affective, professional and a successful individual
5. Should be able to know the important of each phase on the cycle and how these phases affect each other's
6. Understand and create a process model such DFD (Data Flow Diagrams).
7. Understand and create a Logic Model such decision trees and structure English, and decision table.
8. Understand and create a conceptual data model ERD (Entity Relational Diagram)

.**Text Book:**

Modern System Analysis and Design, Jeffrey Hoffer, Joey George, and Joseph Valacich ,Prentice Hall,2008

**Essential References:**

Systems Analysis and Design, Shelly and Rosenblatt, Delmar Learning,2013

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **MATH 212** | **6** | **3** | **1** | **0** | **3** | **STAT 320** | **Probability & Statistics** |

**Course Specification:**

**Lectures:**

Discrete Probability Distributions, Continuous Probability Densities, Joined Conditional Probability, Random Variables, Joint Distribution: Expectation, Variance, Covariance, Correlation Coefficient, Law of Large Numbers, Central Limit Theorem, Generating Functions, Markov Chains, Random Walks. Statistics: Towards Statistical, Thinking for Decision Making,  Descriptive Sampling Data , Analysis, Probability for Statistical Inference and Modelling. Necessary Conditions for Statistical Decision Making,  Estimators and Their Qualities, Hypothesis Testing: Rejecting a Claim, Hypotheses Testing for Means and Proportions, Tests for Statistical Equality of Two or More Populations, Applications of the Chi-square Statistic,  Regression Modelling and Analysis, Index Numbers with Applications.

**Lab:**

Non.

**Objectives:**

1. Learn how to collect data.
2. Present data using various graphical methods.
3. Calculate and interpret numerical summaries.
4. Use and apply laws of probability and learn how these laws are used in statistical inference.
5. Use the concepts of sampling distributions and learn how it applies in making statistical inferences be based on sample of data.
6. Be familiar with some important discrete and continuous distributions.
7. Make appropriate use of statistical inference.

**Outcomes:**

1. The student will have the knowledge and understanding of how to apply statistical concepts into real world problems.
2. The course also serves as a prerequisite to other statistics courses such as probability theory and mathematical statistics.
3. the course assists the student in the understanding and application of many statistical methods and how to analyze real world data.

**Text Book:**

* Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying E. Ye, “Probability and Statistics for Engineers and Scientists”, Pearson; 9 edition (January 6, 2011).

**Essential References:**

* [William Mendenhall](http://www.amazon.com/s/ref=ntt_athr_dp_sr_1?_encoding=UTF8&field-author=William%20Mendenhall&search-alias=books&sort=relevancerank), Introduction to Probability and Statistics , 2008,Brooks/Cole
* Douglas C. Montgomery and, George C. “Applied Statistics and Probability for Engineers”, Wiley; 5 edition (March 03, 0212).

# Courses Description

**Level 7**

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| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** |
| CSI 321 | 3 | 0 | 2 | 2 | Artificial Intelligence | CSI 411 |
| CSI 313 | 3 | 0 | 2 | 2 | Operating Systems | CSI 412 |
| CSI 222 | 3 | 0 | 2 | 2 | Compiler Design | CSI 413 |
| \*\*\* | 3 | \* | \* | \* | Elective Course 1 | \*\*\* |
| -- | 2 | 0 | 0 | 2 | Elective Arabic Course | ARAB \*\*\* |
| -- | 2 | 0 | 0 | 2 | Elective Islamic Course 2 | ISL\*\*\* |
| 72 Cr. Hrs | 1 | 0 | 0 | 1 | Summer Training | CSI 400 |
|  | **17** | | | | **Total** | |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 221** | **7** | **3** | **0** | **2** | **2** | **CSI 311** | **Artificial Intelligence** |

**Course Specification:**

**Lectures:**

The course provides an introduction to the types of problems and techniques in Artificial Intelligence. Problem-Solving methods and major structures used in Artificial Intelligence programs, constraint satisfaction problems. Study of knowledge representation techniques such as predicate logic, non-monotonic logic, and probabilistic reasoning. Application areas of AI such as game playing, expert systems, Machine learning, natural language processing, Neural Network, agents – multi-agents systems, and robotics. Project: cover some course areas using a logic programming tool (Prolog language for example).

**Lab:**

Logic Programming in Prolog - Search Techniques (BFS, IDDFS) - Missionaries & Cannibals problem - Search Techniques - Solving 8 Puzzle problem using A\* Compare - Solutions steps using two different heuristics, (i) manhattan distance, ( ii) misplaced tiles.

**Objectives:**

1. To gain a historical perspective of AI and its foundations and establish the cultural background against which it has developed.
2. To know characteristics of programs that can be considered "intelligent".
3. To provide a thorough understanding of the types of problems solved using AI techniques and understand the different strategies for state space search.
4. To write LISP programs to solve AI problems.
5. To know a thorough treatment of the different types of heuristic search
6. To explore constraint satisfaction problems whose states and goal test conform to a standard, structured, and very simple representation.
7. To know classical examples of artificial intelligence such as game playing.
8. To provide a thorough treatment of the knowledge representation languages, which includes propositional calculus, predicate calculus, and first order logic.
9. To introduce the specification of different architectures for AI problem solving and inductive learning.

**Outcomes:**

1. Know the definition of AI, the foundation of AI, and different applications
2. Ability to define the rational agents and its environment
3. Distinguish the characteristics and structure of each intelligent agent environment
4. Know how to describe goal-based agent
5. Define the main elements of that constitute a problem and its solution with different examples
6. Provide search techniques that use search tree and blind search tools
7. Ability to provide search techniques under partial information with ability to avoid repeated states
8. Ability to write intelligent agent programs using LISP
9. Provide informed search strategy that uses problem specific knowledge such as best first search, greedy best first search, A\* search and others.
10. Examine the nature of heuristics in 8-puzzle and explore local search algorithms
11. Explore search spaces systematically and optimization problems in both discrete and continues spaces using online and offline searches
12. Know the main features of CSP and apply backtracking search for CSP
13. Apply the local search for CSP
14. Apply the constraint graph using connected components and tree decomposition
15. Explain the state of games and defining the different optimal decisions strategies such as minimax algorithm
16. Use pruning search strategies to reach the goal quickly such as Alpha-Beta pruning
17. Provide an overview of all the fundamental concepts of logical representation and reasoning
18. Provide the concepts of propositional logic PL and its semantics with depth reasoning patterns in PL
19. Introduce inference rules for quantifiers and shows how to reduce first order inference to propositional inference
20. Examine the forward chaining and backward chaining and its resolutions
21. Define different areas in learning from observations

**Text Book:**

* Computer Ethics, Fourth Edition, by Deborah Johnson

**Essential References:**

* Readings in CyberEthics, 2nd Edition, Edited by Richard Spinello and Herman Tavani.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CIS 313** | **7** | **3** | **0** | **2** | **2** | **CIS 412** | **Operating Systems** |

**Course Specification:**

**Lectures:**

Fundamental concepts of operating-systems, principles of modern operating systems, including operating systems structures, system performance and models, systems with multiprogramming, process and thread management, processor scheduling, synchronization, basic concepts of deadlock, memory management, File-System Interface ,Storage Structure ,Data Storage on Disks ,File-Systems : Fat ، Fat32 ، NTFS, Hardware Protection.

**Lab:**

Learn how to handle different kind of operating systems including MS-DOS(1 week), windows(2 weeks), linux (3 weeks). Modifying file attribute on MS-DOS, WINDOW AND LINUX (3 WEEK) . determine the user permissions and how to change it for windows and linux (2 weeks). Learning and to writing programs and debug it using linux environment (3 weeks).

**Objectives:**

1. To explain what operating systems are, what they do, and how are they evolved, designed, and constructed.
2. To understand the process concept and concurrency as the heart of modern operating systems.
3. To compare and contrast the common CPU scheduling algorithms used for both preemptive and non-¬preemptive scheduling of tasks in operating systems, such as priority, performance comparison, and fair-share schemes.
4. To understand the concept of process synchronization and to explain the concept of algorithms used to prevent, avoid, and detect deadlocks.
5. To explain the concept of memory management and how it is realized in hardware and software.
6. To explain the concept of virtual memory.
7. To explain, compare and contrast the common disk scheduling algorithms.

**Outcomes:**

1. Know basic terms associated with operating systems, such as Short-Term Scheduler, Long-Term Scheduler, Multiprogramming, Multiprocessors, etc. and know the structure of the operating system.
2. Know the processes’ states and state diagrams.
3. Know how to design several CPU scheduling and identify their performance.
4. Know how to synchronize processes using semaphores and know how to solve deadlocks using different methods.
5. Know different schemes of memory management such as paging, segmentation, and segmentation with paging, and identify their performance.
6. Know how to design different Page-Replacement algorithms and identify their performance.
7. Know how to design different Disk scheduling algorithms and identify their performance.
8. Know the advantages and disadvantages of different interconnection network topologies.

**Text Book:**

* Modern Operating Systems (third edition), Andrew S. Tanenbaum, Prentice Hall Publishers, 2007, ISBN-10: 0-13-600663-9, ISBN-13: 978-0136006633

**References:**

* Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8th edition, John Wiley & Sons, 2008.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 222** | **7** | **3** | **0** | **2** | **2** | **CSI 413** | **Compiler Design** |

**Contents:**

**Lectures:**

This course introduces the student to the design and implementation of compilers. Topics include: compiler organization, algorithms for lexical, syntactic and semantic analysis, top-down and bottom-up parsing (e.g., recursive descent, LL, LR, LALR parsing), symbol table organization, error detection and recovery, intermediate and object code generation, and code optimization. Student has to implement a compiler for a simple high level language (like mini C) as a project .

**Lab:**

Flex: an introduction(2 weeks), building simple lexical analyzer using flex (3 weeks), bison: an introduction (2 weeks), using bison to generate a small parser (3 weeks), and choose a mini-c language to build the lexical analyzer of it as the final project(4 weeks).

**Objectives:**

1. Read and write grammars for programming language constructs
2. Perform lexical analysis and use lexical analyzer generators.
3. Perform top-down parsing, bottom-up parsing and use parser.
4. Perform semantic analysis including static checking, intermediate representations and attribute grammars
5. Create symbol tables
6. Perform run-time analysis
7. Perform code generation
8. Perform optimizations
9. Implement the phases of a compiler for a small recursive language.

**Outcomes:**

1. Build the different parts of a Compiler: Lexical Analyzer, Parser, Code Generation and Optimization.
2. Familiarity with techniques for implementing program analyses and optimizing transformations.
3. Understand and explain the main techniques and algorithms used in compilers.
4. Describe the runtime structures used to represent constructs in typical programming

**Text Book:**

1. R Sethi , J D Ullman & Addison-Wesley : Compilers: Principals, Techniques, and Tools, 3rd , 2007, Addison-Wesley.

**Essential References:**

* Modern Compiler Implementation in Java 2e by Appel, Cambridge University Press ISBN 0-521-82060-X
* Flex and Bison by John Levine, ISBN 978-0-596-15597-1

# Courses Description

**Level 8**

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| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course Name** | **Course Code** |
| CSI 321 | 3 | 0 | 2 | 2 | Distributed Systems & Parallel Processing | CSI 421 |
| CSI 325 | 3 | 0 | 2 | 2 | Software Engineering 2 | CSI 422 |
| CSI 321 | 3 | 0 | 1 | 3 | Cryptography and Information Security | CSI423 |
| Math 310 | 3 | 0 | 2 | 2 | Computer Graphics | CSI 425 |
| \*\*\* | 3 | \* | \* | \* | Elective Course 2 | \*\*\* |
| -- | 2 | 0 | 0 | 2 | Elective Islamic Course 3 | ISL \*\*\* |
|  |  |  |  |  |  |  |
|  | **17** | | | | **Total** | |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 321** | **8** | **3** | **0** | **2** | **2** | **CSI 421** | **Distributed Systems &Parallel Processing** |

**Contents:**

**Lectures:**

The objective of this course is to introduce students to the fundamentals and techniques of distributed computing and provide them with the basic skills of how to write distributed programs. Topics to be covered include: distributed computing, distributed programming, distributed  systems, concurrency, distributed computing paradigms, inter-process communications, group communications, operating system support, distributed objects, application programming interfaces (RMI, RPC), client server model, the socket API, security issues and Internet applications. In this course also, student will study an introduction to parallel processing. Models of parallel machines. Parallel programming paradigms and models. Performance analysis of parallel systems. Parallel programming languages and frameworks. Students are expected to develop distributed applications using latest technologies.

**Lab:**

Examines a range of topics involving parallel and distributed systems to improve computational performance. Topics include parallel and distributed programming languages, architectures, networks, algorithms and applications.

**Objectives:**

1. To introduce the students to the fundamentals of distributed Computer Systems
2. To introduce the students to the parallel processing and models of parallel machines
3. To explain the interaction between hardware and software parts of the system
4. To introduce the power and limitations of parallel and distributed systems
5. To explain the beneficial and challenging aspects of parallelism

**Outcomes:**

1. Understand the fundamental aspects of parallel and distributed processing
2. Be familiar with taxonomies of parallel systems
3. Be familiar with performance measures for parallel systems
4. Understand the theoretical limitations of parallel computing such as intractability
5. Write efficient parallel application programs

**Text Book:**

#### [Michael Allen](http://www.alibris.com/search/books/author/Michael-Allen?aid=103044), [Barry Wilkinson](http://www.alibris.com/search/books/author/Barry-Wilkinson?aid=5434887), Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers (2nd Edition) , Prentice Hall, 2004

**References**

### Distributed Systems: Concepts and Design by G. Coulouris, J. Dollimore and T. Kindberg 2009

### [Distributed Systems: Principles and Paradigms (2nd Edition)](http://www.amazon.com/Distributed-Systems-Principles-Paradigms-2nd/dp/0132392275/ref=sr_1_4?s=books&ie=UTF8&qid=1368826819&sr=1-4) by Andrew S. Tanenbaum and Maarten Van Steen (Oct 12, 2006)

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 325** | **8** | **3** | **0** | **2** | **2** | **CSI 422** | **Software Engineering2** |

**Course Specification:**

**Lectures:**

This course covers the main concepts of object-oriented software engineering concepts. Topics include: object-oriented software processes: Agile process models, process activities, the Rational Unified Process, Computer-Aided Software Engineering. System Models: Context models, Behavioural models, Data models, Object models, CASE workbenches. Object Oriented Concepts: Object approach. Unified Modelling Language (UML): Class Diagram, Object Diagram, Use Case Diagram, Collaboration Diagram, Sequence Diagram, Component Diagram, and Deployment Diagram. Rapid application development and CASE tools for object-oriented systems – Object-oriented systems testing, operation and maintenance.

**Lab:**

Object-oriented task management using suitable CASE tools (2 weeks) – UML and writing SRS (Software Requirements Specification) document for object-oriented systems using suitable CASE tools (4 weeks) - Writing SDS (Software Design Specification) document for Object -oriented systems using CASE tools (e. g. Power Designer) (4 weeks) – using CASE tools in the auto-generation of Object-oriented code (2 weeks) – Object-oriented development using reuse approaches (2).

**Objectives:**

1. To provide students with a broad perspective on Software Engineering.
2. Introduce the ethical and professional responsibility of the software engineer.
3. Explain the project management and the role of management on the success of the project.
4. Explain the process of software engineering, Agile processes, and System Models.
5. Explain the architectural design and the effect of the environment on the type of design we choose for the system
6. Explain the Object Oriented Software design concepts.

**Outcomes:**

1. Understand software processes and the activities of this process, the differences of software process and system engineering process.
2. Understand and use knowledge in the management activities, planning, scheduling and monitoring.
3. Understand and use knowledge in system and its models such as context, behavioral, data, and object models, context diagram.
4. Understand and use knowledge in system architectural design such system structuring, control models, and modular decompositions
5. Analyze, design, construct, realize and validate systems from hard- and software using principles and techniques of software engineering.
6. Translate specific requirements on hard- and software systems into correct and efficient solutions.
7. Participate in a group project involving design using UML and implementation of the design.

**Text Book:**

SOFTWARE ENGINEERING, 9th Ed , by Ian Sommerville, Addison-Wesley, 2011.

**Essential References:**

Software Engineering: A practitioner’s Approach, by Roger S. Pressman, McGraw-Hill Science, 6th,2009.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 321** | **8** | **3** | **0** | **1** | **3** | **CSI 423** | **Cryptography and Information Security** |

**Contents:**

**Lectures:**

The aim of this course is to facilitate understanding of the inherent strengths and limitations of cryptography, especially when used as a tool for information security. Armed with this knowledge, student should be able to make more informed decisions when building secure systems. The course covers various aspects of symmetric and asymmetric cryptography. While some topics will be dealt with in more detail, the course will attempt to provide a broad coverage of possibly all the core areas of cryptography. The students will be expected to implement and analysis some simple cryptographic schemes and read various articles. To understand the principles of encryption algorithms; conventional and public key cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms. Topics include: Overview - Encryption Techniques - Block ciphers and DES - Review of Mathematical concepts - Finite Fields. Advanced Encryption Standard - Block cipher operation - Public key Cryptography and RSA - Other public key cryptosystem - Hash functions: Applications of Cryptographic hash functions, simple hash functions, SHA-3, Digital signatures.

**Lab:**

Students should implement some ciphers algorithms like: AES, RSA, Diffie Hellmann. They can use the language C++ or Visual basic.

**Objectives:**

1. To know the methods of conventional encryption especially substitutions and transpositions techniques.
2. To understand the concepts of public key encryption and number theory.
3. To cover the wide area of applications that need both secret and public keys encryptions.
4. To explain authentication and Hash functions.
5. To examine the network security tools and applications

**Outcomes:**

1. Know why and how to identify, conceptualize and rigorously formalize goals (e.g., what does it mean for communication to be secure?)
2. Make constructions and proofs of security (according to established definitions).
3. To understand the limits of what is possible to achieve, computational assumptions and their implications in cryptography.
4. To distinguish among different concepts of security known worldwide.
5. To cover how to implement secure system in different applications.

**Text Book:**

W. Stallings , Cryptography and Network Security: Principles and Practice , Prentice Hall, 2011

**References**:

* W. Stallings, Cryptography and Network Security: Principles and Practice, Prentice Hall, 2011.
* C. Kaufman, R. Perlman, and M. Speciner, Network Security**,** Private Communication in a Public World. Prentice Hall, 2002.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CIS 324** | **8** | **3** | **0** | **2** | **2** | **CSI 449** | **Geographic Information**  **Systems** |

**Course Specification:**

**Lectures:**

Fundamental Geographic Information Systems concepts to create, edit, and query spatial data. - An introduction to map projections, coordinate systems, data capture, attribute tables - Data manipulation, remote sensing, aerial and satellite imagery and using Global Position Systems (GPS) - Transferring data to GIS data models - Spatial relationships analysis and making decisions from presented information through various geo-processing techniques - Applications of GIS in many fields - Development of GIS systems.

**Lab:**

Introduction to QGIS and View data (2 weeks)- Explore data and compose maps (2 weeks) -Create, edit, manage and export data ( 4 weeks) - Analyze data (2 week)-introduction to map server (2 weeks).

**Objectives:**

1. Define the fundamentals of GIS and develop basic geospatial data manipulation skills.
2. Identify GIS components, roles, and applications.
3. Define fundamental skills in querying geo-databases.
4. Identify the principles and techniques of a number of application areas informed by the research directions of GIS.
5. Interpret and analyze data qualitatively and qualitatively.
6. Develop GIS applications for different fields

**Outcomes:**

1. Define the fundamentals of GIS and develop basic geospatial data manipulation skills.
2. Identify GIS components, roles, and applications.
3. Define fundamental skills in querying geo-databases.
4. Identify the principles and techniques of a number of application areas informed by the research directions of GIS.
5. Develop simple GIS application.

**Text Book:**

Bolstad Paul V., “GIS Fundamentals", Book, Eider Press, 2nd edition, ISBN 0-971-76471,2005.

**Essential References:**

Chang Kang-tsung, “Introduction to geographic information systems", Book, Mc-Graw Hill companies, 3rd edition, ISBN 0-07-060629-3, 2006.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **Math310** | **8** | **3** | **0** | **2** | **2** | **CSI 425** | **Computer Graphics** |

**Contents:**

**Lectures:**

Computer Graphics I is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modelling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.

**Lab:**

Introduce OpenGL programming, Install Dev-C++ and OpenGL environments, Creating an empty window, OpenGL Primitives, OpenGL functions, Adding colours

in OpenGL, Keyboard input, Mouse input, Transformation in OpenGL, Set a view, Draw 3D objects, Translate ,Rotate ,Scale, Set Viewing Transformation, Projection Transformations, Lighting and Materials, Texture Mapping.

**Objectives:**

1. To introduce the students with the concepts and principles of computer graphics
2. To give a thorough description of computer graphics hardware and software systems.
3. To understand the theory and application of Transformation and Viewing.
4. To understand the graphics pipeline: Modelling, Viewing and Rendering
5. To design and implement a simple project using OpenGL

**Outcomes:**

1. Introduce Computer Graphics
2. Understand the role of Matrices & Vector
3. Apply the 2D Transforms
4. Apply the 3D Transforms and projection
5. write small project using OpenGl

**Text Book:**

D. Hearn and M. Baker., Computer Graphics with Open GL, 3rd EdPrentice Hall, 2004 **References:**

* D. Hearn and M. Baker. Computer Graphics with Open GL, 3rd Ed, Prentice Hall, 2004.
* Computer Graphics using Open GL by F. Hill, 2nd Ed., Prentice Hall, 2001.
* Computer Graphics (Principles and Practice) by Foley, Van Dam et al, 2nd Ed.Addison Wesley, 1990.
* Fundamentals of 3D Computer Graphics, by Alan Watt, latest Ed., Addison Wesley.

# Courses Description

**Level 9**

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| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course name** | **Course Code** |
| 120 Cr. Hrs | 2 | 0 | 0 | 2 | Graduation Project 1 | CSI 510 |
| CSI 322 | 3 | 0 | 2 | 2 | Web Programming & Internet Technology | CSI 511 |
| CSI 314 | 3 | 0 | 2 | 2 | Data Mining | CSI 512 |
| CSI 222 | 3 | 0 | 2 | 2 | Concepts of Prg. Lang. | CSI 513 |
| \*\*\* | 3 | \* | \* | \* | Elective Course 3 | \*\*\* |
| \*\*\* | 2 | 0 | 0 | 2 | Elective Prerequisite Univ. | \*\*\* |
|  | **17** | | | | **Total** | |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **120 Hours** | **9** | **2** | **0** | **0** | **2** | **CSI 425** | **Graduation Project 1** |

**Contents:**

**Lectures:**

This course is the first of a two-course sequence in which the students will develop a complete software system. The second stage will be carried out in CSI420. Students will work in groups of up to four students, each group will have a supervisor to guide them through the system development process using a specific methodology.

In this first part, each group must identify a problem domain, define the problem, identify and specify the requirements, document the current system, analyze it, propose alternative systems, and design a solution. The design must include the definitions of all the required system models, such as the data model and the functional model. At the end of the course, each group must submit a formal report documenting the complete process.

**Lab:**

Non.

**Objectives:**

1. To introduce the

**Outcomes:**

1. Introduce

**Text Book:**

**References:**

Non.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 322** | **9** | **3** | **0** | **2** | **2** | **CSI 511** | **Web Programming & Internet Technology** |

**Course Specification:**

**Lectures:**

This course presents number of powerful software technologies that will enable the student to build systems to integrate Internet, web components, and remote databases. It presents the “client-side” and “server-side” of web programming. For the client side it presents a carefully paced introduction to using the popular JavaScript language and the closely related technologies of XHTML (Extensible Hypertext Mark-up Language), CSS (Cascading Style Sheets). Novices will find that the material in the JavaScript chapters presents a solid foundation for the deeper treatment of scripting. The third class concentrates on using technologies such as web servers, databases (integrated collections of data), PHP, ASP.NET, to build the server side of web-based applications.

**Lab:**

Internet Surfing, Create email account, Search Engines - Web Page Development –HTML, XML - using inline, internal, and external CSS - writing JavaScript inline, internal, and external codes - writing server side application using PHP - writing server side application using ASP.NET - building server side, client side integrated database application (Mini Project).

**Objectives:**

1. Introduce the web development objective
2. And Introduce the Hyper Text Markup Language HTML (30%)
3. Introduce the Extensible Markup Language (XML (
4. And Explore the difference between HTML and XML (10%)
5. Use the Cascading Style Sheets (CSS) to design any webpage (25%(
6. Introduce the Client\_Side Scripting language (JavaScript) and Working with Server\_side script language - PHP (20%(
7. Working with Server\_side script language – ASP.NET (15%).

**Outcomes:**

1. Use HTML and CSS to design different WebPages
2. Use scripting languages to add interactivity to the WebPages
3. differentiate between the client and server side programming
4. Design different WebPages with different styling
5. Program the server using the PHP
6. Use the java scripts to design efficient WebPages
7. Identify the methodology of physical model.
8. On completing this course, the students are expected to be able to:

* Design a group project
* Implement different techniques discussed in the lectures during the course

**Text Book:**

David R. Brooks, G., “An Introduction to HTML and JavaScript: For Scientists and Engineers” , Publication Date: July 5, 2007 | ISBN-10: 1846286565 | ISBN-13: 978-1846286568 | Edition: 2007.

**Essential References:**

* Programming the World Wide Web, 6/E, Robert W. Sebesta, University of Colorado, Colorado, Springs, ISBN-10: 0132130815, ISBN-13: 9780132130813, Addison-Wesley, 2011
* Perry, Schneider: New Perspectives on The Internet Course Technology, 6th Edition ISBN 1-4188-6071-9.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 214** | **9** | **3** | **0** | **2** | **2** | **CSI** **422** | **Data Mining** |

**Course Specification:**

**Lectures:**

This course introduces the basic theories and methodologies of data mining process includes data selection and cleaning, machine learning techniques to ``learn" knowledge that is ``hidden" in data, and the reporting and visualization of the resulting knowledge. This course will cover these issues and will illustrate the whole process by examples of practical applications from the life sciences, computer science, and commerce. Several machine learning topics including classification, prediction, and clustering will be covered. Machine learning packages.

**Lab:**

To teach the student popular data mining tools such as WEKA: Introduction to Bioinformatics (2 Weeks) - Decision tree Ensemble methods (2 Week) -Multilinear and logistic regression (2 Weeks) - Perceptron Models Unsupervised Learning methods (2 Weeks) - Clustering Nice interactive k-means demo (2 Weeks) - Predicting Networks Through Bayesian Inference (2 Weeks). Applications of Spectral methods (2 Weeks) . Introduction to minimum description length (MDL) principle Kernel PCA (2 Weeks).

**Objectives:**

1. To provide the student with an understanding of the concepts of data
2. warehousing and data mining
3. To study the dimensional modeling technique for designing a data warehouse
4. To study data warehouse architectures, OLAP and the project planning aspects
5. in building a data warehouse
6. To explain the knowledge discovery process
7. To describe the data mining tasks and study their well-known techniques

**Outcomes:**

1. Knowledge and understanding
2. To discuss the different issues related to data warehousing and data mining.
3. To provide students with a clear understanding of the different data warehouse
4. architectures and data mining techniques
5. Cognitive skills (thinking and analysis).
6. To explain the nature of the knowledge discovery process and its challenges
7. To explain the different data mining tasks and their common real world applications.
8. Communication skills (personal and academic).
9. To discuss the different evaluation methods of data mining and data warehousing.
10. Practical and subject specific skills (Transferable Skills).
11. To explain the different data mining tasks and their common real world applications.
12. To teach the student popular data mining tools such as WEKA

**Text Book:**

* Vipin Kumar, Introduction to Data Mining, [Addison-Wesle](http://www.aw-bc.com/catalog/academic/product/0,1144,0321321367,00.html)y - 2006.

**Essential References:**

* M.H. Dunham, Data Mining (Introductory and Advanced Topics), Prentice-Hall, 2002
* Berry M.J.A. & Linoff, G.S., Mastering Data Mining, Wiley 2000.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 222** | **9** | **3** | **0** | **2** | **2** | **CSI 513** | **Concepts of programming languages** |

**Course Specification:**

**Lectures:**

This course introduces to students the following topics: Brief history of programming languages - Formal grammars - BNF notation - Principles of modern programming languages: features, design and evaluation - Imperative versus declarative language styles - General-purpose language features, such as types, operators, expressions, subprograms, recursion, and object-orientation - Special purpose language features, such as support for graphical interface, concurrency, and non-determinism - Relationship between language design and implementation.

**Lab:**

Operational semantics, Assignment and basic control flow, Scope and variable binding, Simple types, Type safety, Shared-memory concurrency (threads, locks, transactions, memory-consistency models)

**Objectives:**

1. Understand the concepts of programming languages by discussing the design issues of the various languages constructs.
2. Examining the design choices for these constructs in some of the most common languages and critically comparing design alternatives.
3. To provide the students with the tools necessary for the critical evaluation of existing and future programming languages.
4. To prepare the student for the study of compiler design.
5. It talks about many historical languages such as PASCAL, Ada, C, C++, Java, C# and others.

**Outcomes:**

1. Knowledge and understanding
2. Understand the fundamental programming constructs.
3. Understand and write searching and sorting techniques.
4. Understand a typical C-like program environment.
5. Cognitive skills (thinking and analysis).
6. Be able to understand and analysis any problem and derive its solution.
7. Be able to develop algorithms.
8. Communication skills (personal and academic).
9. Be able to work as a team
10. Practical and subject specific skills (Transferable Skills).
11. Be able to write C-like programs including searching and sorting techniques.

**Text Book:**

Robert W. Sebesta , Concepts of Programming languages, Addison-Wesley edition 7, 2006.

**Essential References:**

1. David A. Watt, Programming Language Design Concepts, Wiley (May 31, 2004).

# Courses Description

**Level 10**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Prerequisite** | **Cr** | **Ex** | **Lb** | **Le** | **Course** | **Course Code** |
| CSI 510 | 3 | 0 | 0 | 3 | Graduation Project 2 | CSI 520 |
| CSI 511 | 3 | 0 | 2 | 2 | Human Computer Interaction | CSI 522 |
| CSI 422 | 2 | 0 | 0 | 2 | Professional Ethics | CSI 525 |
| \*\*\* | 3 | \* | \* | \* | Elective Course 4 | \*\*\* |
| \*\*\* | 3 | \* | \* | \* | Free Elective Course | \*\*\* |
|  | **14** | | | | **Total** | |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 510** | **10** | **3** | **0** | **0** | **3** | **CSI 520** | **Graduation Project 2** |

**Contents:**

**Lectures:**

In this course, each group will continue developing the software systems started in CSI 410. Each group must use a particular tool to implement its system in a good programming practice. This implementation tool is preferably new –i.e. not taken in previous courses. Furthermore, students must generate a user manual for their information system in an appropriate format. At the end of the term, each group must submit a final report, which documents completely the information system from the problem definition phase to the implementation phase and contains a user manual for the information system. Team work, leadership, communication and writing skills are all important ingredients for a successful project.

**Lab:**

Non.

**Objectives:**

**Outcomes:**

**References:**

Non.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 511** | **10** | **3** | **0** | **2** | **2** | **CSI 522** | **Human-Computer Interaction** |

**Course Specification:**

**Lectures:**

Human-Computer Interaction (HCI) is a rapidly expanding research and development area that has transformed the way we use computers in the last thirty years. The course introduces fundamental methods, principles and tools for designing, programming and testing interactive systems. It also introduces students to the design, implementation, and evaluation of human-computer interfaces, with emphasis on user-centered design and graphical user interfaces (GUI). The course covers topics such as usability and affordances, user-centered design, human cognitive and physical ergonomics, information and interactivity structures, interaction styles, interaction techniques, and user interface software tools with a special focus on mobile user interfaces.

**Lab:**

Analyze a Usability Problem - Static Information Presentation - Importance of Good Design - Advantages of Graphical Interface - Use of interactive devices - Visually pleasing composition - Organizing screen element - Chosing color - Develop system menus and navigation schemes -Provide effective feedback, guidance and assistance.

**Objectives:**

1. Acquire the fundamentals of Human-Computer Interaction
2. Develop interactive UI evaluation skills
3. Develop a toolbox of proper design guidelines
4. Acquire GUI programming skills
5. Learn a variety of interface evaluation techniques

**Outcomes:**

After studying the course you will be able to

1. Knowledge and understanding tools for designing, programming and testing interactive systems.
2. Explain why it is important to design Interactive products that are usable
3. Define key terms used in interaction design
4. Explain key theories used in the design of interactive products
5. Explain the importance of iteration, evaluation design and prototyping in interaction

**Text Book:**

* Dix, A., Finlay, J., Abowd, G., & Beale, R., “Human-computer interaction” , 3rd edition Prentice Hall Europe. ISBN: 0130461091 | Edition: 2003

**Essential References:**

* Galletta, Dennis & Zhang, Ping,” Human Computer Interaction and Management Information Systems :Applications”, M. E. Sharpe Inc., ISBN-10: 0765614871 Edition: 2006

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 422** | **10** | **2** | **0** | **0** | **2** | **CSI 525** | **Professional Ethics** |

**Course Specification:**

**Lectures:**

This course will examine the ethical issues that arise as a result of increasing use of computers, and the responsibilities of those who work with computers, either as computer science professionals or end users. The course will stress the ways in which computers challenge traditional ethical and philosophical concepts, and raise old issues in a new way. By the end of this course, students will be expected to read and understand the ideas in the readings; explain the ideas; analyze issues and see them from diverse perspectives; and formulate and critique arguments. The readings will include technical issues in computer science and may focus on a particular area such as software design as well as more traditional topics such as philosophical theories (e.g. ethical relativism, utilitarianism, deontological theories, rights, and virtue ethics), privacy, intellectual property rights and proprietary software, security, accountability, liability, the digital divide, hacking, and viruses.

**Lab:**

Non.

**Objectives:**

1. To develop understanding of the contemporary ethical issues that engineers often face
2. in professional practice
3. To develop the appreciation and the ability to more clearly and deeply about ethical issues
4. To explore to resources for dealing with professional and personal conflicts
5. To develop the need for underrating health and safety in the workplace
6. To develop the need for professional registration and practice

**Outcomes:**

1. Read and understand the ideas in the readings; explain the ideas
2. Analyze issues and see them from diverse perspectives and formulate and critique arguments
3. Understand technical issues in computer science focusing on a particular area such as software design
4. Understand more traditional topics such as philosophical theories (e.g. ethical relativism, utilitarianism, deontological theories, rights, and virtue ethics), privacy, intellectual property rights and proprietary software, security, accountability, liability, the digital divide, hacking, and viruses.

**Text Book:**

Computer Ethics, Fourth Edition, by Deborah Johnson

**Essential References:**

Readings in CyberEthics, 2nd Edition, Edited by Richard Spinello and Herman Tavani.

**Elective Courses Descriptions**

**Track I: Computer Graphics & Multimedia**

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| **Course**  **Number** | **Course Title** | **Credits Hours** | **Weekly Hours** | | **Prerequisite** |
| **Lecture** | **Lab** |
| CSI 414 | Digital Image Processing | 3 | 2 | 2 | MATH 310 |
| CSI 424 | Computer Vision | 3 | 2 | 2 | CSI 414 |
| CSI 514 | Interactive Computer Graphics | 3 | 2 | 2 | CSI 425 |
| CSI 521 | Multimedia Technology | 3 | 2 | 2 | CSI 425 |
| CSI 530 | Digital Photography | 3 | 2 | 2 | MATH 220 |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **MATH 310** | **elective** | **3** | **0** | **2** | **2** | **CSI 414** | **Digital Image Processing** |

**Course Specification:**

**Lectures:**

The current course aims to provide an introduction to basic concepts and methodologies for digital image processing in both theoretical and practical aspects. Therefore the course topics are selected to provide a good understanding and design principles for several effective techniques used for image enhancement and to provide the necessary knowledge for further study in Computer Vision, Scientific Visualization and Image Pattern Recognition. These topics are: Introduction: Image Models, Image Acquisitions and digitization, Terminologies - Image Transformations: Manipulation & Processing by (Fourier, Discrete Cosine, Hoteling, Wavelet transforms) - Image Enhancement: Spatial & Frequency Domain Filters methods - Image Compression methods and Restoration - Image Segmentation.

**Lab:**

MATLAB: an Introduction (2 Weeks) - Image Transformations (2 Weeks) - Image Enhancement (2 Weeks) - Image Compression (2 Weeks) –Segmentation (4 Weeks)

**Objectives:**

1. Develop a theoretical foundation of fundamental Digital Image Processing concepts.
2. Provide mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
3. Provide a good understanding and design principles for several effective techniques used for image enhancement.
4. Gain experience and practical techniques to write programs using MATLAB language for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression
5. Emphasizes both the theory and application of image processing for real-world problems.

**Outcomes:**

1. Have a clear understanding of the principals the Digital Image Processing terminology used to describe features of images.
2. Have a good understanding of the mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing, compression and analysis.
3. Be able to write programs using Matlab language for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
4. Have knowledge of the Digital Image Processing Systems.
5. Be able to understand the documentation for, and make use of, the MATLAB library and MATLAB Digital Image Processing Toolbox (IPT).
6. Learn and understand the Image Enhancement in the Spatial Domain.
7. Learn and understand the Image Enhancement in the Frequency Domain.
8. Understand the Image Restoration, Compression, Segmentation, Recognition, Representation and Description.
9. Be able to use different digital image processing algorithms.
10. Be able to design, code and test digital image processing applications using MATLAB language.
11. Be able to use the documentation for, and make use of, MATLAB library and MATLAB Digital Image Processing Toolbox.
12. Analyze a wide range of problems and provide solutions related to the design of image processing systems through suitable algorithms, structures, diagrams, and other appropriate methods.
13. Practice self-learning by using the e-courses and web materials.
14. Plan and undertake a major individual image processing project.
15. Be able to write programs in Matlab language for digital manipulation of images; image acquisition ; preprocessing; segmentation; Fourier domain processing; and compression.

**Text Book:**

Rafael Gonzalez, “Digital Image Processing” ,Prentice Hall, 2008.

**Essential References:**

* [Maria Petrou](http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Maria+Petrou%22), " Image Processing: The Fundamentals" ,  John Wiley and Sons, 2010.
* [Wilhelm Burger](http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Wilhelm+Burger%22), [Mark Burge](http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Mark+Burge%22), “Principles of digital image processing: Fundamental Techniques”, Springer, 2009.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 414** | **8** | **3** | **0** | **2** | **2** | **CSI 424** | **Computer Vision** |

**Course Specification:**

**Lectures:**

This course covers fundamental topics in computer vision. The course will provide an introduction to image formation, image processing, feature detection, segmentation, multiple view geometry and 3D reconstruction, motion, face detection, object recognition and classification. As such, after completing this course, students: learn the basics of computer vision and some of the state-of-the-art techniques. They will be able to write programs that can perform image segmentation, image matching, object detection or recognition, and applications such as content-based image retrieval or construction of panoramas. Upon completion of the course they should be able to take an internship or job with a vision company or research lab doing vision or to participate in undergraduate research leading to potential graduate level research.

**Lab:**

MATLAB: an Introduction (2 Weeks) - Image Geometry (2 Weeks) - Binary Object (2 Weeks) - Edge Detection (2 Weeks) - Histogram Thresholding Segmentation (3 Weeks)- Morphological Filters (3 Weeks).

**Objectives:**

1. To introduce the principles of computer vision
2. To introduce models of computer vision
3. To introduce applications of computer vision
4. Some mechanisms used in biological visual systems that may inspire design of artificial ones

**Outcomes:**

1. Learn the basics of computer vision and some of the state-of-the-art techniques
2. understand the roles of image transformations and their invariances in pattern recognition and classification
3. analyse the robustness, brittleness, generalisability, and performance of different approaches in computer vision
4. to describe key aspects of how biological visual systems encode, analyse, and
5. represent visual information
6. understand in depth at least one important application domain, such as face recognition, detection, or interpretation.

**Text Book:**

[Computer Vision: A Modern Approach](http://www.cs.berkeley.edu/~daf/book.html) by D. A. Forsyth and J. Ponce, Prentice Hall, Upper Saddle River, N.J., 2003

**Essential References:**

* Digital image processing. by Willian K. Pratt. 2007.
* Handbook of Computer Vision Algorithms in Image Algebra by Gerhard X. Ritter; Joseph N. Wilson CRC Press, CRC Press LLC.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 425** | **10** | **3** | **0** | **2** | **2** | **CSI 514** | **Interactive Computer Graphic**s |

**Course Specification:**

**Lectures:**

The current course aims to provide an introduction to basic concepts and methodologies for digital image processing in both theoretical and practical aspects. Therefore the course topics are selected to provide a good understanding and design principles for several effective techniques used for image enhancement and to provide the necessary knowledge for further study in Computer Vision, Scientific Visualization and Image Pattern Recognition. These topics are: Introduction: Image Models, Image Acquisitions and digitization, Terminologies - Image Transformations: Manipulation & Processing by (Fourier, Discrete Cosine, Hoteling, Wavelet transforms) - Image Enhancement: Spatial & Frequency Domain Filters methods - Image Compression methods and Restoration - Image Segmentation

**Lab:**

OpenGL 3D primitives and transformation (2 Weeks) - Hierarchical transformation (2 Weeks) - Lighting and shading (3 Weeks) - geometric modelling in OpenGL (2 Weeks) - programmable shaders (3 Weeks) – animation (2 Weeks).

**Objectives:**

1. To provide an introduction to the theory and practice of interactive computer graphics
2. Introduce physically based rendering, mesh-handling methods, and mesh-based interaction

**Outcomes:**

1. Will gain familiarity with modern interactive computer graphics through careful study of several areas
2. Will gain familiarity with physically based rendering, mesh-handling methods, and mesh-based interaction
3. Student knowledge will be deepened by in groups on an extended project in which expected to implement a substantial portion of some recent paper in computer graphics
4. Student will develop some extension of that work based on his own ideas.

**Text Book:**

Rafael Gonzalez, “Digital Image Processing” , Prentice Hall, 2008.

**Essential References:**

[Maria Petrou](http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Maria+Petrou%22), " Image Processing: The Fundamentals" ,  John Wiley and Sons, 2010.

[Wilhelm Burger](http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Wilhelm+Burger%22), [Mark Burge](http://www.google.com/search?tbo=p&tbm=bks&q=inauthor:%22Mark+Burge%22), “Principles of digital image processing: Fundamental Techniques”, Springer, 2009.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 425** | **6** | **3** | **0** | **2** | **2** | **CSI 521** | **Multimedia Technology** |

**Course Specification:**

**Lectures:**

The creation of interactive multimedia products for cross-platform delivery - Introduction to Multimedia Authoring and Production - The Multimedia Development Process - Introduction to Multimedia Scripting - Types of Lingo Scripts / Behaviors / Handlers - The Sampling Process: Understanding Audio / Video - Using Lists and Casts - Understanding Programming Structures - Human Computer Interface Design - Graphics, Audio, and Movie File Formats - Databases, Lists, and Shockwave - Storage and Delivery Technologies - Global Development Issues - Legal Issues, Copyrights, Taxes.

**Lab:**

To implement Bresenham’s algorithms for line, circle and ellipse drawing - To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing - To implement Cohen–Sutherland 2D clipping and window–viewport mapping - To perform 3D Transformations such as translation, rotation and scaling - To visualize projections of 3D images and Hidden Surface Elimination - To convert between color models - To implement text compression algorithm - To implement image compression algorithm - To perform animation using any Animation software - To perform basic operations on image using any image editing software.

**Objectives:**

1. the broad foundation of multimedia
2. and human-computer interaction that defines the root of multimedia.
3. what its possible uses and applications of multimedia are
4. what multimedia and interaction technologies include
5. the basis of computer technologies such as compression algorithms that have made multimedia possible
6. the essentials of Audio media
7. creating animation with Flash
8. An introduction to Action Script
9. skills required to develop and manage multimedia projects

**Outcomes:**

1. Define The Multimedia technology
2. Works with modern graphics technologies
3. Differentiate between image types and deal with them individually.
4. Introduced to using adobe flash to make animations and program them using action script
5. Be able to produce multimedia projects

**Text Book:**

* McGloughlin, S (2001): Multimedia Concepts and Practice.

**Essential References:**

* Chun,Garaffo (2003): Macromedia Flash MX 2004 for Windows and Macintosh: Visual QuickStart Guide.
* Niderest, J (2001): Web Design in a Nutshell.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **MATH 220** | **9** | **3** | **0** | **2** | **2** | **CSI 530** | **Digital Photography** |

**Course Specification:**

**Lectures:**

This course  is intended to introduce students to the basic concerns in digital photography as a fine art medium, and the computer as a darkroom.  Includes digital imaging techniques of scanning, colour correction, retouching, composition, content and more.  Hardware, image input and output processes, and software are also discussed as such. After completing this course, the student should demonstrate a basic knowledge of fundamental digital photographic theory and make images which correspond to basic photographic design and communication principles.  Students will also demonstrate proficiency in the use of image manipulation software and digital imaging applications in addition to utilizing major computer hardware components and accessories, including scanners, printers, CD recorders and storage devices while managing the colour digital workflow through all production stages from image capture to final output.  Students will also be able to demonstrate an awareness of contemporary aesthetic, legal and ethical considerations in digital imaging.

**Lab:**

Beginning Aperture/ Shutter. Bring your camera, camera manual, and one roll of film to class. Middle gray Over/Under exposure. Density vs. Contrast (2 weeks) - Introduction to Photoshop (2 weeks) - Scanning and Printing demo. Color channels (2 weeks) - Scanner as Camera (2 weeks) - More Photoshop instructions. Selections and Channels (2 weeks) - Layers demo (2 weeks) - Adjustment Layers, Blending Modes, Advanced slashing, and burning and dodging (2 weeks).

**Objectives:**

1. To introduce an introduction to digital photography emphasizing the technical and aesthetic issues and how these qualities inform image content
2. To develop competency in the digital darkroom through lessons and projects that teach photography and Photoshop skills. These skills will then be applied to developing an expressive visual language
3. To make each student competent in the conceptual, aesthetic and technical aspects of digital photography
4. To introduce the technical necessities: how to operate a digital camera, manage the image files, and various ways to output the images

**Outcomes:**

1. Students will also be able to demonstrate an awareness of contemporary aesthetic, legal and ethical considerations in digital imaging.
2. The student should demonstrate a basic knowledge of fundamental digital photographic theory and make images which correspond to basic photographic design and communication principles.
3. Students will also demonstrate proficiency in the use of image manipulation software and digital imaging applications in addition to utilizing major computer hardware components and accessories, including scanners, printers, CD recorders and storage devices while managing the color digital workflow through all production stages from image capture to final output.

**Text Book:**

* Introduction to Digital Photography – Joseph Ciaglia

**Essential References:**

* Real World Digital Photography, 2nd edition, Eismann, Duggan, Grey, ISBN 0-321-22372-1
* Photography  8th edition, London/Upton/Kobre/Brill, Prentice Hall (2002).

**Track II: Computer Networks**

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| **Course**  **Number** | **Course Title** | **Credits Hours** | **Weekly Hours** | | **Prerequisite** |
| **Lecture** | **Lab** |
| CSI 431 | Advanced Computer Networks | 3 | 2 | 2 | CSI 322 |
| CSI 432 | Network Security | 3 | 2 | 2 | CSI 431 |
| CSI 531 | Wireless & Mobile Computing | 3 | 2 | 2 | CSI 322 |
| CSI 532 | Network Programming | 3 | 2 | 2 | CSI 431 |
| CSI 533 | Cloud Computing | 3 | 2 | 2 | CSI 322 , CSI 321 |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 322** | **9** | **3** | **0** | **2** | **2** | **CSI 431** | **Advanced Computer Networks** |

**Course Specification:**

**Lectures:**

This course is an advanced topic in design and analysis of computer networks. It comes as a second level module of the curricula which includes: Modeling, performance evaluation and queuing theory applied to computer networks.- Traffic flow management and error control - - Routing algorithms and protocols. - Switch and router architectures - Selected issues in high speed network design - Optical networks.

**Lab:**

Modeling, performance evaluation and queuing theory experiments.- Traffic flow management and error control experiments - Routing algorithms and protocols experiments. - Switch and router architectures experiments.

**Objectives:**

1. This module aims to provide a broad coverage of some new advanced topics in the field of computer networks (wireless networks, mobile networks, VPN networks, Mobile IP, etc).
2. Learn about Advanced Routing algorithms
3. Understand the concept of advanced Network Congestion Control algorithms
4. To improve understanding of the concepts of Internetworking

**Outcomes:**

1. Understand the main abstract concepts related to the layered communication architecture
2. Analyze and implement some of the most advanced routing and congestion control algorithms.
3. Evaluate the performances of computer networks (through mathematical modeling and simulation
4. Understand basics and principles of new generation of computer networks (VPN, wireless networks, mobile networks…).
5. Practice network simulators

**Text Book:**

* Computer Networks 5th Ed. Andrew S. Tanenbaum, Pearson Prentice Hall, 2010.

**Essential References:**

* Wireless Communications & Networks*,* 2nd edition, William Stallings, Prentice-Hall Pearson.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 431** | **7** | **3** | **0** | **2** | **2** | **CSI 432** | **Network Security** |

**Course Specification:**

**Lectures:**

This course provides an introduction to the field of network security. Specific topics to be examined include Security attacks, mechanisms, and services. Network security and access security models. Network security practice. Email security. IP security and web security. Intrusion detection and prevention systems. Firewalls and virtual private networks. Cellular and wireless network security.

**Lab:**

Students should implement protocols of email security, IP security, and web security using any network simulation.

**Objectives:**

1. Introduce students with the importance of security for computer systems**.**
2. Introduction to security goals and the services of security system.
3. Explain available methods of defence.
4. Distinguish Key Distribution and User Authentication.
5. Describe Transport-Level Security such as, Web Security Issues, Secure Sockets Layer (SSL) and Transport Layer Security (TLS).
6. Describe Wireless Network Security and explains the general idea of, IEEE 802.11 Wireless LAN Overview, IEEE 802.11i Wireless LAN Security, Wireless Application, Protocol Overview, Wireless Transport Layer Security and WAP End-to-End Security
7. Introduce Electronic Mail Security with details.
8. Introduce Public-key encryption concept and detailed RSA algorithm
9. Introduce students with, IP security, and web security

**Outcomes:**

1. Understand the concepts of confidentiality, integrity, authentication, non-repudiation, and availability
2. Asses the threats, vulnerabilities, and risks to a computer network
3. Understand Transport-Level Security such as, Web Security Issues, Secure Sockets Layer (SSL) and Transport Layer Security (TLS).
4. Understand the concepts of Wireless Network Security`
5. Understand the generic issues of Electronic Mail Security and IP security.

**Text Book:**

* William Stallings, Network Security Essentials Applications and Standards (6th Edition), Prentice Hall, 2013.

**Essential References:**

* Douglas Jacobson, Introduction to Network Security, Taylor & Francis, 2008.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 322** | **elective** | **3** | **0** | **2** | **2** | **CSI 531** | **Wireless and Mobile Computing** |

**Course Specification:**

**Lectures:**

This course is offered for those who are interested in understanding and building systems support mechanisms for mobile computing and wireless systems including client-server web/database/file systems, and mobile ad hoc and sensor networks for achieving the goal of anytime, anywhere computing in wireless mobile environments. The technologies involved to realize such a system will be covered and the fundamental concepts of mobile computing are introduced. These include mobility and service management, data management, routing in mobile ad hoc and sensor networks, and security issues for mobile systems. While mobile computing covers many topics, in this course the main focus will be on mobility, data and service management, and security issues in mobile computing environments. Students are expected to be familiar with basic concepts in Operating Systems and Networks in this class.

**Lab:**

Experiments including:client-server web/database/file systems, and mobile ad hoc and sensor networks for achieving the goal of anytime

**Objectives:**

In this course you will:

1. acquire solid knowledge on mobile networks and mobile computing
2. acquire experience and capability to team work
3. become familiar with mobile game development

**Outcomes:**

On completion of this course you should be able to:

1. apply advanced data communicating methods and networking protocols for wireless and mobile environments
2. utilize and employ application frameworks for developing mobile applications including under disconnected and weakly connected environment
3. create web sites suitable for mobile environments
4. select components and networks for particular application
5. creatively analyze mobile and wireless networks
6. critically analyse security issues of mobile and wireless computing systems
7. design and implement simple mobile games

**Text Book:**

* Amjad Umar, “Mobile Computing And Wireless Communications: Applications, Networks, Platforms, Architectures and Security”, NGE Solutions (July 15, 2004 ), ISBN-10: 0975918206.

**Essential References:**

* F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert,” Fundamentals of Mobile and Pervasive Computing”, McGraw Hill, 2005, ISBN: 0-07-141237-9.
* Mohsen Guizani, “Wireless Networks and Mobile Computing”, Wiley Communications Technology Online ISSN: 1530-8677*.*

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 431** | **6** | **3** | **0** | **2** | **2** | **CSI 532** | **Network Programming** |

**Course Specification:**

**Lectures:**

Introduction to networking and Internet protocols via programming and hands-on labs. TCP/IP protocol architecture; user datagram protocol (UDP); multicasting; transmission control protocol (TCP); standard Internet services, and protocol usage by common Internet applications. Sockets programming; client/server; peer-to-peer; Internet addressing; TCP sockets; UDP sockets; raw sockets. Multithreading and exception handling. Finger, DNS, HTTP, and ping clients and servers. Routers and architectures, routing protocols. Router and switch configurations, Internet operating systems. Internetwork setup, network topology, wireless internetworking. Network protocol analyzers; traffic generation.

**Objectives:**

1. Understand the TCP/UDP network programming interface;
2. Understand the methodology of design and implementation of client-server network applications;
3. Develop non-trivial and robust network applications.

**Outcomes:**

A. Knowledge and Understanding (students should be able to understand):

1. the basic concepts associated with network programming
2. the role of a protocol in controlling the communication between hosts in a network
3. the advantages of multithreaded applications

B. Intellectual skills (students should be able to):

1. distinguish between transport layer protocols
2. design a new simple protocol
3. recognize the significance of flexibility, extendibility, simplicity, and efficiency in
4. protocol design and implementation

C. Subject specific skills (students should be able to):

1. use Java I/O streams and Java exception handling primitives
2. implement practical network protocols, for clients and servers, using Java networking

API

1. write multithreaded UDP clients and servers

D. Transferable skills (students should be able to):

1. work in a group to write the specification of a simple protocol and implement a network program.
2. work in a group to implement the described protocols
3. work in a group to demonstrate the aims 1, 2, and 3

**Lab:**

Write a program to Create Sockets For Sending And Receiving Data. - Write a program to Obtain The Local & Remote Socket Address - Write a program to Create Sockets For Handling Multiple Connection - Write a program to Obtain The Information About The (A) Host (B) Network (C) Protocols (D) Domains - Write a program to Manipulate The IP Address. - Write a program to Write A Telnet Client - Write a program to Make An FTP Client - Bulding applicable project(mini Project).

**Text Book:**

* Brian “Beej Jorgensen” Hall, Beej's Guide to Network Programming, Publication Date:Version 3.0.15, July 3, 2012.

**Essential References:**

* David Reilly and Michael Reilly, *Java Network Programming and Distributed Computing*, Addison-Wesley (ISBN: 0-201-71037-4).

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 322 , CSI 321** | **Elective** | **3** | **0** | **2** | **2** | **CSI 533** | **Cloud Computing** |

**Contents:**

**Lectures:**

Cloud Computing uses Internet as the platform for the development and delivery of computing technologies. Topics discussed in this course include: cloud computing concepts, cloud computing architecture, Infrastructure as a Service (IaaS), Platform-as-a-Service (PaaS), Software as a Service (SaaS), cloud computing access and implementation, and cloud computing with MapReduce.

**Lab:**

Examines a range of topics involving Windows Azure Platform, main component and how to use it, use SQL Azure , use the AppFabric to develop his own cloud application written in php or java or .net, learn how control this created application.

**Objectives:**

1. Demonstrate the understanding of the fundamental concepts and architecture of Cloud Computing
2. Demonstrate the understanding of the concepts of Infrastructure as a Service (IaaS)
3. Demonstrate the understanding of the concepts of Platform-as-a-Service (PaaS)
4. Demonstrate the understanding of the concepts of Software as a Service (SaaS)
5. Demonstrate the understanding of MapReduce, a software framework that supports parallel computing on large data set

**Outcomes:**

# Understand the fundamental concepts and architecture of Cloud Computing

1. Understand the concepts and applications of Infrastructure as a Service (IaaS)
2. understand the concepts and applications of Platform-as-a-Service (PaaS)
3. Understand the concepts and applications of Software as a Service (SaaS)

**References**

### Cloud Computing Explained: Implementation Handbook for Enterprises, Recursive Press, ISBN 0956355609, 2009

### Cloud Computing Explained: Implementation Handbook for Enterprises by John Rhoton (Nov 2, 2009)

**Track III: Individual Track :**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course**  **Number** | **Course Title** | **Credits Hours** | **Weekly Hours** | | **Prerequisite** |
| **Lecture** | **Lab** |
| CSI 441 | Machine Learning | 3 | 2 | 2 | CSI 411 |
| CSI 442 | Introduction to Robotics | 3 | 2 | 2 | CSI 411 |
| CSI 443 | Expert Systems | 3 | 2 | 2 | CSI 411 |
| CSI 444 | Computational Methods | 3 | 2 | 2 | Math 310 |
| CSI 445 | Operational Research | 3 | 2 | 2 | STAT 320, MATH 310 |
| CSI 446 | Information System Management | 3 | 2 | 2 | CSI 314 |
| CSI 447 | Information Security | 3 | 2 | 2 | CSI 423 |
| CSI 448 | Project Management | 3 | 2 | 2 | CSI 422 |
| CSI 449 | Geographic Information Systems (GIS) | 3 | 2 | 2 | CSI 324 |

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 411** | **Elective** | **3** | **0** | **2** | **2** | **CSI 441** | **Machine learning** |

**Contents:**

**Lectures:**

Machine learning is the science of getting computers to act without being explicitly programmed. This course provides a broad introduction to machine learning. Topics include: (i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks). (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning). (iii) Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI)..

**Lab:**

Introduction to WEKA package, the components of this tool and how use it ,and prepare the dataset to use it, write a small project in mat lab to apply the algorithm explained in the course and how to use its result.

**Objectives:**

1. Learning from performance criterion using example data or past experience.
2. How to build systems that learn and adapt using real-world applications
3. Learning unsupervised Learning algorithmes.
4. Learning supervised Learning algorithmes
5. Pattern classiﬁcation application
6. Face Recognition application
7. Data regression application

**Outcomes:**

1. Building a learning system from experience
2. Solving Face Recognition Problem
3. Solving Pattern Classiﬁcation Problem

**References:**

* [Ethem Alpaydin](http://www.amazon.com/Ethem-Alpaydin/e/B001KD8D4G/ref=ntt_athr_dp_pel_1), Introduction to Machine Learning, ISBN-10: 026201243X | ISBN-13: 978-0262012430, MIT press, 2009.
* Christopher Bishop, Pattern Recognition and Machine Learning. Springer, 2006.
* Tom Mitchell, Machine Learning. McGraw-Hill, 1997.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 411** | **Elective** | **3** | **0** | **2** | **2** | **CSI 442** | **Introduction to Robotics** |

**Course Specification:**

**Lectures:**

Introductory historical development of robotics, robot arm kinematics, inverse kinematics, dynamics and control, trajectory planning, use of software packages, sensors, image acquisition and processing, control architectures, applications of mobile robots, autonomous mobile robots (navigation and localization), computer vision, vision-based control. Topics will include how to interface a computer with the real world, different types of sensors and their use, different types of actuators and their use, and forward and inverse kinematics of simple two link robotic manipulators.

**Lab:**

Position, velocity, and acceleration analysis - Kinematics of four-bar mechanisms - Concepts of stress and strain - DC and AC electrical circuit analysis - DC motors principles.

**Objectives:**

1. Present the basic concepts of Robotics
2. Define What's a Robot
3. Introduce a brief history of Robotics and their relations to Artificial Intelligence
4. Study the basic robot components, how to interface a computer with the real world, different types of sensors and their use, different types of actuators and their use, and forward and inverse kinematics of simple two link robotic manipulators.
5. Study the methods of Robot control and representations
6. Build and test a robot system in laboratory

**Outcomes:**

1. The know-how of the fundamentals of robotics in the core areas of mechanics, control, perception, artificial intelligence, and autonomy.
2. Perform spatial transformations associated with rigid body motions.
3. Perform kinematics analysis of robot systems
4. Understand concept of sensors and actuators and Identify sensors and actuators required for specific applications.
5. Perform basic calculation associated with trajectory planning.
6. Understand basic issues and programming principles associated with robot control.
7. Implement hardware and software to build a robot that can perform a task.

**Text Book:**

* John J. Craig, Introduction to Robotics: Mechanics and Control (3rd Edition), 2004, Prentice Hall.

**Essential References:**

* Saeed B. Niku, SaeedNiku- Introduction to Robotics: Analysis, Control, Applications, 2010, Wiley.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 411** | **Elective** | **3** | **0** | **2** | **2** | **CSI 443** | **Expert Systems** |

**Course Specification:**

**Lectures:**

This course introduces students to expert systems in general and to rule-based systems in specific. Students learn how to build a rule-based expert system in a variety of application areas. They also learn advanced programming techniques which include topics of inexact reasoning, intelligent database management methods, and how to develop a community of expert systems which cooperate over a blackboard structure. Students are also given the opportunity to demonstrate their understanding of the technology by building a rule-based expert system that addresses a real-world problem. The course prepares students for graduate research in the area of expert systems.

**Lab:**

CLIPS Overview, Deftemplate Construct, Deffacts Construct, Defrule Construct, Defglobal Construct, Deffunction Construct, Generic Functions.

**Objectives:**

1. An awareness of the principles of knowledge representation.
2. An understanding of expert system techniques and logic, particularly as related to knowledge representation and decision support system.
3. An understanding of the major knowledge representation paradigms: production rules and ontology of knowledge representation.
4. An understanding of how these representations can be manipulated to solve problems in knowledge based systems context.
5. Some appreciation of the major knowledge based systems and expert system.
6. Familiarity with the essentials of expert system.

**Outcomes:**

1. To introduce students to knowledge representation, common knowledge representation paradigms and the issues involved in knowledge representation (e.g. knowledge based systems, ontology and decision support system).
2. To introduce students to the sorts of systems that can be built using expert system techniques, in particular knowledge based systems and rule-based expert system, ontology based system.
3. To give students an awareness of the issues involved in building such systems.
4. To provide a grounding in expert system and intelligent system

**Text Book:**

Expert Systems -- Principles and Programming, J. Giarratano and G. Riley, PWS Publishing Company, 2004

**Essential References:**

Introduction To Expert Systems, Peter Jackson, Addison-Wesley, 1998.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **Math 310** | **Elective** | **3** | **0** | **2** | **2** | **CSI 444** | **Computational Methods** |

**Course Specification:**

**Lectures:**

The current course provides powerful understanding and manipulation of what is called approximate/numerical solutions. The exact solution, in many practical cases, is not only difficult to be reached, but it may be impossible to find it. Therefore it was the need to look for effective algorithms to establish these stable, and convergent approximate solutions. These algorithms will handle important several topics concerned with: Numerical Differentiation, Root location (Bracketing Methods, Opened Methods), Numerical Integrations, Numerical Solution of Linear Systems of Equations, Curve Fitting, Interpolation, Numerical Solution of Ordinary and Partial Differential Equations.

**Objectives:**

1. Predict and estimate the error in approximate/numerical solution.
2. Employ computational rules to execute solutions and to compute the accuracy of the results.
3. Use of Computer Mathematical Packages. Calculating fluently and accurately in abstract notation.
4. Formulate proofs and construct counterexamples.
5. Effective communications and presentation orally.
6. Think critically about solutions and to defend an intellectual position.
7. Grasp how mathematical processes may be applied to problems including an understanding that might give only a partial solution.
8. Acquire teamwork communications skills, e.g. Lead and motivate individuals.
9. Work in stressful environment and within constraints

**Outcomes:**

1. Ability to find numerical solutions of linear and nonlinear equations effectively and understand the convergence properties of different algorithms and the conditioning of linear systems.
2. Understanding the concept and algorithms of data interpolation including polynomial and spline interpolation.
3. Perform numerical differentiation and numerical integration and their error analysis.
4. Find numerical solutions to ordinary and partial differential equations.
5. Find solutions of equations directly and/or iteratively.
6. Developing the least square data or function approximations using families of linear and non-linear functions .

**Lab:**

Non.

**Textbook:**

* Steven C. Chapra**,**  “Numerical Methods For Engineers” , McGraw Hill, 2002.

**Essential References:**

* Michelle Schalzman**,** “Numerical Analysis: A Mathematical Introduction”, Clarendon Press**,** 2002**.**
* J. Douglas Fairs**,** “Numerical Analysis”,PWS-KENT Publishing Company, 1989.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **STAT 320**  **MATH 310** | **Elective** | **3** | **0** | **2** | **2** | **CSI 445** | **Operational Research** |

**Course Specification:**

**Lectures:**

The current course introduces the basic concepts of Optimization and its tools and how can this be applied to problems of the real life. This objective can be successfully achieved through the conduction of the following topics: Basic concepts of Optimization, Operations Research and the art of Problem Solving, Linear Programming: Convexity, Extreme Points, Formulation and Graphical Solution, Analytical Solution of Linear Programming: the Simplex-Tableau, Theorem of Duality.

**Objectives:**

* 1. Understand the paradigm What is, Why we need, How to use tools of, and Where/When to apply: Optimization.
  2. Recognizing Absolute and Conditional Extrema of continuous functions in real life.
  3. Learning how to determine the type of solution (and find this solution if it exists) for a system of linear equations.
  4. Introducing linear programming as one of the Operations Research techniques used in planning for utilizing available resources with the best possible manner.
  5. Understanding of the mathematical properties of linear programming models, by graphical and algebraic concepts.
  6. Exploring of some practical applications that can be solved by linear programming and the ability to formulate linear programming problems.
  7. Applying the Simplex method to solving linear programming problems, then performing sensitivity analysis on optimal solution.
  8. Understanding Duality.

**Outcomes:**

1. The development of adequate suitable formulation of the problem as an Absolute Extrema or as a Conditional one.
2. The ability of formulation and solution of the problem as a Linear System of equations or as a Linear Programming Model.
3. Recognizing the famous Algorithms to formulate and solve real-life problems.
4. Achieving graphical draw, in two and three dimensions to represent systems of equations and inequalities.
5. Understanding the duality theorem and relationship between primal and dual problems.

**Lab:**

Non.

**Text Book:**

* Hamdy A. Taha; “Operations Research: An Introduction”; Printice Hall, 9th Edition, 2010.

**Essential References:**

* Ali Emrouznejad, William Ho; “Applied Operational Research with SAS", Chapman and Hall/CRC, December 2011.
* P. Rama Murthy; “Operations Research", New Age International Publishers, 2nd Edition, 2007.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CIS 314** | **Elective** | **3** | **0** | **2** | **2** | **CSI 446** | **Information Systems Management** |

**Course Specification:**

**Lectures:**

This course aims to develop the students’ ability to plan, analyze, design, implement, validate, and maintain computerized information systems using software processes. Specifically, the course will: Develop the students' skills of selecting a suitable process model (for better project management and better quality software) for a specific software project, introduce frameworks and quality standards for software development and management, highlight and integrate new process models for new environments (e. g. the WWW), introduce software metrics for better quality management.

**Lab:**

Appropriate software processes experiments - Experiments of software development and management using suitable tools – integration of new process models for new environments.

**Objectives:**

1. This module aims to introduce the function of Managing Information Systems that exist in working/business digital firms or organizations.
2. It introduces the management perspectives of these systems as new recourses of organization’s management: “the hybrid management”. The course stresses on the aspects and roles of managing information systems in e-business and e-commerce.
3. Case studies are examined to highlight the IT infrastructure and applications used in modern digital Firms

**Outcomes:**

1. Explain why awareness of IT-based information systems is important for e-business
2. professionals
3. Illustrate how information systems support e-business, e-commerce, and digital enterprise integrated systems, and decision making and strategies for competitive advantage
4. Be able to present papers Practical and subject specific skills (Transferable Skills(.
5. Identify the challenges that an e- business manager might face in managing the secured, successful, and ethical development and use of information systems in his/her business.
6. Identify the components of information technology that might be implemented in managing information systems in the digital enterprise.

**Text Book:**

* [Barbara McNurlin](http://www.amazon.com/s/ref=ntt_athr_dp_sr_1/175-1172477-3786108?_encoding=UTF8&field-author=Barbara%20McNurlin&search-alias=books&sort=relevancerank) , [Ralph Sprague](http://www.amazon.com/s/ref=ntt_athr_dp_sr_2/175-1172477-3786108?_encoding=UTF8&field-author=Ralph%20Sprague&search-alias=books&sort=relevancerank) , [Tung Bui](http://www.amazon.com/s/ref=ntt_athr_dp_sr_3/175-1172477-3786108?_encoding=UTF8&field-author=Tung%20Bui&search-alias=books&sort=relevancerank) , Information Systems Management (8th Edition), Publication Date: September 15, 2008 | ISBN-10: 0132437155 | ISBN-13:978-0132437158 | Edition: 8.

**Essential References:**

* Business Information Systems: Technology, Development & Management for the E-Business, 3rd ed. Paul Bocij, Dave Chaffey, Andrew Greasley (editor) & Simon Hickie, Prentice-Hall Pearson 2006.

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 423** | **7** | **3** | **0** | **2** | **2** | **CSI 447** | **Information Security** |

**Course Specification:**

**Lectures:**

This course is to make students familiar with the basic concepts of information systems security. The course aims to the security goals, security functions, and security mechanisms. The content is: Introduction to information Security, Information security and risk management, Access control, Security architecture and design, Physical environmental security, Telecommunications and network security, Business continuity and disaster recovery, Application security and Operation security.

**Lab:**

Students should implement protocols of access control, network security, viruses and worms.

**Objectives**:

1. The choice of appropriate encryption/decryption is the key in the development of efficient secure information system. In fact, it is difficult to create a trusted
2. information system without a good understanding of a number of fundamental
3. information security issues. This module aims
4. To learn how the choice of encryption and decryption algorithm design methods impacts the performance of any information system.
5. To learn how to define the security problems.
6. To study specific algorithms for encryption and decryption.
7. To study a wide spectrum of different issues where we can protect our information systems

**Outcomes:**

1. Understand the basic concepts of the information systems security;
2. Understand a variety of generic security threats and vulnerabilities, and identify and analyze particular security problems for a given application;
3. Understand the design of security protocols and mechanisms for the provision of security services needed for secure networked applications;
4. Understand the design of security protocols and mechanisms for the
5. provision of security services needed for secure networked applications;
6. Apply appropriate security techniques to solve security problems;

**Text Book:**

# [Michael E. Whitman](http://www.google.com.sa/search?hl=ar&tbo=p&tbm=bks&q=inauthor:%22Michael+E.+Whitman%22), [Herbert J. Mattord](http://www.google.com.sa/search?hl=ar&tbo=p&tbm=bks&q=inauthor:%22Herbert+J.+Mattord%22), "Principles of information security";Delmar Learning; 4 edition (February 1, 2013).

**Essential References:**

# [Mark Merkow](http://www.amazon.com/s/ref=ntt_athr_dp_sr_1?_encoding=UTF8&field-author=Mark%20Merkow&search-alias=books&sort=relevancerank), [James Breithaupt](http://www.amazon.com/s/ref=ntt_athr_dp_sr_2?_encoding=UTF8&field-author=James%20Breithaupt&search-alias=books&sort=relevancerank),"Information Security: Principles and Practices", Prentice Hall (August 29, 2005)

* Cryptography and network Security*:* Principles and Practice*;* William Stallings, Prentice Hall 2002

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| **Prerequisite** | **Level** | **Weekly Hours** | | | | **Course Number** | **Course Title** |
| **Credit** | **Ex** | **Lab** | **Lecture** |
| **CSI 422** | **Elective** | **3** | **0** | **2** | **2** | **CSI 448** | **Project Management** |

**Course Specification:**

**Theoretical part:**

The course introduces the students to the various concepts and methodologies of Project Management. The course describes the actual procedures and techniques used in planning, monitoring and controlling projects. The course introduces a number of exercises and case studies (Workshops) within the learning scope of the course to help students to acquire basic and advanced concepts of project management fundamentals. This course enriches the students' understanding of best practices and the advantages of using project management skills to increase their productivity and enable them reach higher returns from investments in Information Technology (IT). As such, after completing this course the student should be able to: Understand the basic familiarity (literacy) of Project Management. Demonstrate an understanding of the basic concepts of Project Management, thus, enabling him/her to functionally utilize these skills in his/her future practices.

**Practical part:**

Introduction to MS Project 2007, Creating a New Project: Gathering Information, Opening a Project file, Establishing Basic Project Information,  Building Tasks, Creating Resources & Assigning Costs: Understanding Resources, Tracking Project Progress, Recording Actuals – Organizing the Updating Process, Understanding Calculation Options, Updating Tasks to Reflect Actual Information, Using Actuals and Costs.

**Objectives:**

1. To introduce the different projects management technologies. Effective project management ensures that a project is completed on time, within budget, and with high quality. Specific techniques for accomplishing these three goals are not always so obvious.
2. The purpose of this course is to make these techniques more obvious, and
3. expose the student to a variety of techniques to manage the budget, schedule, and quality of software projects.

**Outcomes:**

1. To provide students with a clear understanding of the unique risks, issues, and critical
2. success factors associated with Information Technology projects
3. To introduce students to the role and function of project management
4. To explain the stages and process of the project life cycle
5. To understand the need and techniques for managing users and user expectations
6. To learn project planning techniques through the use of different tools (e.g. Microsoft Project)

**References**

1. Project Management: A Managerial Approach, 5th Edition, Jack R. Meredith, Samuel J. Mantel, Jr., ISBN: 0-471-07323-7, John Wiley 2003.
2. [Modern erp: select, implement & use today's advanced business systems](http://www.amazon.com/Modern-erp-implement-advanced-business/dp/0557434076/ref=sr_1_1?s=books&ie=UTF8&qid=1368815449&sr=1-1) by Marianne Bradford (Oct 21, 2010)

# Student guidance

**The first Article: Definitions**

Academic year: Two main semesters and a summer semester if need be.

**The semester:**

A period of time not less than fifteen weeks, during which courses are taught. The period for registration and final examinations are not counted within this period.

Some courses may have prerequisite(s) or co-requisite(s).

**The Summer Semester:**

A period of time not more than eight weeks. The period for registration and final examinations are not counted within this period. Each course is taught extensively within this period.

**Academic Level**

It indicates at what stage a student studies. Graduation requires studying eight levels or more according to credit hours plans.

**Course:**

 An educational material related to a specific level within the credit hours plan for each programmed. Each course has a number , code ,name and specification that distinguishes it from other courses. Each course has also a special file that a department keeps for the purposes of follow up, assessment and development.

**Credit Hour:**

A weekly theoretical session not less than fifty minutes, a clinical session not less than fifty minutes, or a practical/ field work not less than hundred minutes.

**Academic Warning:**

Notification made to a student because of his /her low grade point average, from the minimum shown in this by-law.

**Class Work Score:**

A score given to a student showing his/her achievements on the continuous assessment from tests, research and other academic activities related to the course.

**Final Examination**

A final examination administered once at the end of a semester.

**Final Examination Score**

The score that a student achieves in each course in the final tests of the semester.

**The Final Score**

The sum total of class work scores and final examination score for each course. The score is computed out of hundred.

**The Grade**

Description of the percentage or an alphabetical code for the final score a student achieves in each course.

**Incomplete Grade**

 A grade entered provisionally for each course a student is unable to fulfill its requirement in the specific time. It is referred to in the academic record with the abbreviation (IC) **.**

**Continuous Grade**

A grade entered provisionally for each course which nature of study requires more than one semester for completion. It is referred to with the abbreviation (IP).

**Semester Grade Point Average**

Sum total of the points a student  achieves divided by the total credit hours for all the courses studied in every semester. Points are computed by multiplying the credit hours of a course by the grades a student achieves for each course.

**Cumulative Grade Point Average**

Sum total of the points a student achieves in all the courses he/she studies since his enrolment in the university, divided by the total credit hours for all those courses. Refer to Appendix (B).

**The General Grade**

 Description of the level of a student's academic achievement during the period of his study in the university.

**The Minimum Academic Load**

The minimum credit hours a student should register for, compatible with his Grade Points Average, as decided by the university Council.

## Level system

\* School system divides the academic year into two semesters, there may be a summer semester that is a half-term presence.

## Absence

\* A student attending lectures and practical lessons, and denied entry into the final test if increased absenteeism (25%) Lectures and practical classes for each course during the semester the student is denied access to the test because of absence he has in the course and made him appreciate deprived (ح) or (DN).

\* Medical reports within the selected absence rate 25% except hypnosis hospitals or security custody only.

\* The student who is absent from the final exam will have degree zero on that test, and calculates his appreciation of that decision on the basis of quarterly business degrees obtained.

\* If the student is unable to attend the final examination in any of the articles of the chapter for compelling excuse Faculty Board may, in extreme cases accept the excuse, allowing him an alternative test which is held within a period not exceeding the following semester and gives the estimate after performing the test.

# Deferral and Leaving Study

**Article XIV:**

The student may apply for deferral of study for reasons acceptable to the University Council. Duration of deferral should not exceed two consecutive semesters, or maximally, three non-consecutive semesters throughout his study in the university. After that his registration shall be cancelled .The University Council may make exceptions if necessary. The period of deferral shall not be counted as part of the required period for completing the requirements of graduation.

The Operational Rule for Majmaah University:

The student may apply for deferral of study before the end of the first week for an acceptable reason to the dean of his faculty or whoever he delegates, provided that the duration of deferral shall not exceed two consecutive semesters, or three non-consecutive semesters. The students in the faculties that adopt the annual system may not defer for two consecutive years. Maximally, the period of deferral should also not exceed two non-consecutive years during his study in the university, after that his registration shall be cancelled. If necessary, the University Council may consider some. Exceptional cases.

The period of deferral shall not be counted within the specified period for completing the requirements of the study.

 Female student who escorts her husband or her legal escort may defer her academic situation (admission or registration) for a period not exceeding five years. If a female student wishes to resume her study, she is allowed to, taking into account the following:

If the syllabi is changed, the similar courses that the student had already studied shall be equated and the requirements of graduation to be completed in accordance with the new syllabus.

If the syllabi are not changed, the student resumes from her previous academic situation.

After five years, the chance of the female student may be preserved in the department for her to begin as a new comer.

The deferred student must register after the end of the deferral period otherwise he considered as leaving study.

The Dead ship of Admission  and Registration shall require for the approval of the female student's guardian when she applies for the deferral of the semester.

**Article XV**

If the regular student leaves study for one semester without deferral, his registration in the university shall be cancelled. The University Council may cancel the registration of the student if he left study for less than that period. As for the external student, his registration will be cancelled if he absents himself from all the final examinations of the semester without an acceptable excuse.

The Operational Rule for Majmaah University:

The registration of "the student leaving study because of non-registration" will be cancelled if he does not address his academic situation before the end of the week from the beginning of the semester.

**Article XVI**

The student shall not be considered as leaving study for the semesters s/he studies as a visiting student in another university

The Operational Rule for Majmaah University:

See Article Fifty and its Operational Rule related to the visiting student

# Attendance and Withdrawal

**Article IX**

The regular student must attend the lectures. He shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester. The student who is debarred, because of absence, is considered as a failure in the course, and will be awarded the denial grade (DN).

The Operational Rule for Majmaah University:

 The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course. He will be awarded the score of the course work and given the denial grade (DN).

The lists of the debarred students shall be approved by the concerned Faculty Board.

The lists of the debarred students shall be announced before the beginning of the final examinations.

**Article X**

The Faculty Board or whoever it delegates may, exceptionally, forward the debarred students lists and allow the students for entering the examination, provided he will give  an acceptable excuse to the board. The University Council will determine the percentage of absence, provided it shall not be less than (50%) of the lectures for the course.

**Article XI**

The grade of the student who absents himself from the final examination shall be zero in that exam. His grade in that course shall be counted according to the scores of the course work he obtains.

**Article XII**

If the student is not able to attend the final examination in any course of the semester, for a compulsive excuse, the Faculty Board, in very urgent cases, may accept his excuse and give him the permission for a substitute examination to be conducted within a period not exceeding the end of the following semester. He shall be given the grade he obtains after sitting for the substitute exam.

The Operational Rule for Majmaah University:

The excuse for absence from the final examination shall be accepted in the following cases:

The cause of the excuse should be timely given until a week after the cause is over.

The compulsive excuses accepted by the Faculty Board.

The substitute examination and entering of the grade shall be within a period not exceeding the end of the following semester.

**Article XIII**

The student may withdraw from the semester without being considered as failure if he provides an acceptable excuse to the authority specified by the University Council, within a period of time specified by the operational rules, approved by the University Council. The grade (W) shall be given to the student. This semester will be counted as part of the time required to complete the requirements of graduation.

The student may withdraw from one course or more in a semester with an excuse, according to the operational rules approved by the University Council.

The Operational Rule for Majmaah University

 (13-1) a student may withdraw from studying a semester without being considered a failure, if he forwards an application to that effect to the dean of his faculty, at least three weeks before the beginning of the final examinations in accordance with the university schedule. The students of the faculties that adopt the annual system may withdraw before at least five weeks from the beginning of the final examinations. The students of the short courses may withdraw before the beginning of the examinations, equivalent to one third of the duration of the course. The university Rector may exceptionally, consider some , very urgent cases if necessary, from these durations, in which cases the student is given the withdrawal grade(W) and this period is counted as part of the of the time for completing the requirements of graduation.

 (13-2) Withdrawal chances shall not exceed two consecutive or three non-consecutive semesters. As for the students of the faculties that adopt the annual system, they may not withdraw for two consecutive years. Years of withdrawal should not exceed two non-consecutive academic years throughout the student's stay in the university, after which period, the student's registration is cancelled. The dean of Admission and Registration may consider some exceptional cases.

(13-3) Dean of Admission and Registration may ask for the acceptance of the guardian of the female-student when she applies for withdrawal from a semester.

(13-4)A student may withdraw from one course or more per a semester and no more than three courses throughout the period of his study in the university in accordance with the period specified in the rules, according to the following conditions:

Approval of the dean of the faculty.

Applying for withdrawal from the course before the deadline for withdrawal from the semester.

The abbreviation (W) is entered for the course a student withdraws from

# Dismissal from the University

The student shall be dismissed from the university in the following cases:

1. Maximally, if he has got three consecutive probations, because of his decreasing CGPA to less than the fixed rate for graduation in accordance with the Article (19) of this by-law. According to a recommendation from the faculty board, the University Council may give a fourth chance for those who can raise their CGPAs by studying the available courses.
2. If he does not complete the requirements of graduation maximally within half the period for his graduation in addition to the duration of the program. The University Council may give an exceptional chance for the student to complete the requirements of graduation within a period that should not exceed double the period fixed  for  graduation.
3. The University Council may, in exceptional instances, treat the cases of the students to whom the provisions of the preceding two paragraphs apply, by giving them an exceptional chance that does not exceed two semesters, maximally.

## The Operational Rule for Majmaah University

1. The student shall be given probation if his CGPA decreases from 2.00 out of 5.00. That will be evident in his academic record.
2. If the student gets three consecutive probations, he will be deemed academically dismissed. His case shall be treated as follows:
3. The University Council may give the student a fourth chance in accordance with a recommendation of the Faculty Board for those who can raise their CGPAs by studying the available courses.
4. The Standing Committee for Students' Academic Problems may recommend to the university Council to give the student a fifth chance according to the recommendation of the Faculty Board, provided there is an improvement in his performance in the last semester, his CGPA being not less than 2.00 out of 5.00 and he can raise his it by studying the available courses.
5. The University Council may exceptionally give the student a sixth last chance after the recommendation of the Standing Committee for the Students' Academic Problems.
6. For the faculties that adopt the annual system , the student is deemed academically dismissed if his CGPA decreased to less than (2.00) for two consecutive years, until the Faculty Board takes a decision on it as follows:
7. The Faculty Board may recommend to the University Board to give the student a first chance. If the student fails to raise his GPA, afterwards, the Faculty Board recommends about him to the Standing Committee for Students' Academic Problems.
8. The Standing Committee for Students' Academic Problems may recommend to the University Council to give the student a second chance based on the recommendation of the Faculty Board. If the student fails to raise his CGPA afterwards, the committee may recommend about him, if necessary, to the University Council.
9. The University Council may, exceptionally, give the student a last third chance after the recommendation of the Standing Committee for the Students' Affairs.
10. If the student does not complete the requirements of graduation within the limited period for graduation, his case will be addressed as follows:
11. If he does not complete the requirements of graduation maximally within half the period for his graduation added to the period of the program, the Faculty Board may give the student an exceptional chance to complete the requirements of graduation within a maximal period not exceeding twice the fixed original period for graduation, provided the cause of delay is e acceptable to the Faculty Board.
12. The University Council may give the dismissed students who have exhausted twice the period of the program, a chance not exceeding two semesters, recommended by the Standing Committee for the Students' Academic Affairs.
13. The Faculty Board makes an inventory of all the cases it receives and presents them to the relevant councils and informs the Deanship of Admission and Registration within a period of time not exceeding the first two weeks from the commencement of the semester. In case of delay, the student shall not be permitted to register except for the following semester.

# Tests

**Article XXII**

The concerned Faculty Board determines the midterm score according to the recommendation of the department board. It should not be less than 30% of the final score of the course.

**The Operational Rule for Majmaah University:**

1. The concerned faculty board responsible for the course determines the midterm score according to the recommendation of the concerned department in the range between (40%) and (60%) of the final score.
2. According to the recommendation of the department board ,the faculty board shall make decisions as regards the following:
3. Amendment of the results
4. Determining substitute exams

**Article XXIII**

**The Midterm score is counted in one of the following ways**

1. Oral tests or practical tests, research, classroom activities, some or all of them, including at least one written test.
2. Two written tests at least.

**Article XXIV**

According to the recommendation of the department board, the concerned faculty board responsible of the course may include the final examination in any course, written or oral. It may also determine the specified scores out of the final exam.

**Article XXV**

According to the recommendation of a course instructor, the department board assuming the responsibility of teaching a course may allow the student to complete requirements of any course in the following semester. The abbreviation (IC) is used to indicate to this. It will neither be included in the calculating Grade Point Average nor Cumulative Grade Point Average, until the student completes the requirements of that course. If a semester lapses without the student changing the (IC) in his academic record, it will be substituted for (F) and counted within his or her (GPA) and (CGPA).

**Article XXVI**

All or some of research, debate, science oriented or field work courses may be treated exceptionally from the provisions of articles (22, 23,24)  by decision from the faculty board. The faculty board shall determine assessment of  a student's achievement in these courses.

**The Operational Rule for Majmaah University:**

All or some of research, debate, science oriented or field work courses which include the clinical courses may be treated exceptionally from the provisions of articles (22,23,24) by a decision from the faculty board according to the recommendation of the department board responsible for teaching the courses. The Faculty Board determines the evaluation of the student's achievement in these courses.

**Article XXVII**

If research courses require more than one semester the grade (IP) shall be used. After completion of the course, the student is will be given the grade s/he obtains. If the course is not completed in the fixed time, the concerned department board may my approve entering the grade (IC) in the student's record.

**The Operational Rule for Majmaah University:**

The fixed time for completing a course which grade is (IP) is one semester following the semester in which the student has obtained the grade (IP)

**Article XXIX**

Taking into account requirements of Article (19) of this By-law, when the student graduates, his general grade for Cumulative Average will be as follows:

1. (Distinction) if the CGPA is not less than 4.000-5.00, or 3.00 out of 4.00
2. (Very Good) if the CGPA is from 3.75-to less than 4.50 out of 5.00 or 2.75 to less than 3.50 out of 4.00.
3. (Good) if the CGPA is from2.75 to less than3.75 out of five or 1.75 to less than2.75 out of 4.00.
4. (Pass) if the CGPA is from 2.00 to less than2.75 out of 5.00 or rom1.00 to less than 1.75 out of 4.00.

## The Operational Rule for Majmaah University:

The general grade for the GPA when the student graduates are based on his CGPA according to the grade weight. Out of (5.00) points.

**Article XXX**

Honors Degree is awarded to the student who obtains CGPA (4.75) to (5.00) out of (5.00) or (3.75) to (4.00) out of (4.00) in graduation. The Second Class Honors is awarded to the student who obtains the CGPA (4.25) to less than (4.75) out of (5.00) or from (3.25) to less than (3.75) out of (4.00) in graduation**.**

**The following conditions are required for obtaining the first Class or the Second Class Honors Degree:**

1. The student should not have failed in any course during his studies in the university or any other university.
2. The student should have completed the requirements of graduation within a period not more the average between the maximum and the minimum period for staying in his faculty.
3. The student should have studied at least 60% of graduation requirements in the university from which he obtains the degree.

**The Operational Rule for Majmaah University:**

Honors Degree is awarded to the student who obtains CGPA (4.75) to (5.00) out of (5.00) or (3.75) to (4.00) out of (4.00) in graduation. The Second Class Honors is awarded to the student who obtains the CGPA (4.25) to less than (4.75) out of (5.00) or from (3.25) to less than (3.75) out of (4.00) in graduation**.**

**The following conditions are required for obtaining the First Class or the Second Class Honors Degrees:**

1. The student should not have failed in any course during his studies in the university or any other university.
2. The student should have completed the requirements of graduation within a period not more the average between the maximum and the minimum period for staying in his faculty.
3. The student should have studied at least 60% of graduation requirements in the university from which he obtains the degree.

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# Transfer from University to another

**Article Forty Two**

A student's transfer from another university may be accepted according to the following regulations:

1.     The student must have studied at a recognized university.

2.     He must not be dismissed from the university he referred from for disciplinary reasons.

3.     Terms of transfer, determined by the University Council, must be applicable to him.

**The Executive Rule of Majmaah University:**

A student's transfer from another university may be accepted according to the following regulations:

1.     He should have an academic record with a cumulative average of at least one semester and studied in a faculty or university recognized by the Ministry of Higher Education.

2.     He should not have failed in the GPA.

3.     He should not have been dismissed from the University for Disciplinary Reasons.

4.     Transfer should not be from the lower academic degree to the higher.

5.     Conditions of transfer, determined by the Faculty Board, must be applicable to him.

6.     Credit hours required from the transferred student to study, must not be less than 60% of the total credit hours for obtaining the BA degree from Majmaah University.

7.     The total period spent by the student from the university he transfers from and the remaining period for him in Majmaah University should not be more than the average period between the minimum and the maximum for remaining in the faculty.

8.     Procedures of transfer must be completed before the end of the first week from the beginning of the semester, or the beginning of the year for the faculty's that adopt the annual system. If the procedures exceed this period, transfer shall be effective next semester.

9.     Transfer must be written on the student's academic record.

**Article Forty Three**

The Faculty Board equates the courses the student studies in another university, according to a recommendation of the Department Board that provides the courses. The courses equated are written on the student's record. They are not included in the calculation of cumulative GPA.

**The Executive Rule of Majmaah University:**

The concerned faculty board equates the courses the student passes in another university, according to a recommendation of the Department Board that gives the courses, provided the equated courses should not exceed 40% of the credit hours of the syllabus of the specialization transferred to. The courses equated are written on the student's record. They are not included in the calculation of cumulative GPA, on condition that the content of the course the student passes is equivalent to the course(s) to be equated.

**Article Forty Four**

If it appears after the student's transfer, that he had previously been dismissed for disciplinary reasons, his registration shall be deemed canceled from the date of acceptance of his transfer to the university.

**Article Forty Five**

A student may be transferred in any semester, from a university to another, according to the procedures and declared schedules in the university transferred to, in the light of the general guidelines for transfer.

## Transfer from Faculty to Another within the University

**Article Forty Six**

The student may transfer from one faculty to another within the university in accordance with the regulation sap proved by the University Council.

## The Executive Rule of Majmaah University

Firstly, transfer of a student from one faculty to another within the university is done according to the following regulations:

1.     Acceptance of the students by deanship of the faculty is according to the regulations set by the Faculty Board.

2.     A student must not have spent more than four semesters, provided that the preparatory programs such as extensive language courses are not counted within that period.

3.     Procedures of transfer should be completed within the first week of the semester or the academic year, for the faculties that adopt the annual system. If the procedures exceed this period, transfer shall be effective the following semester.

4.     Transfer shall not be allowed except after a student spends at least one semester in the faculty he wishes to transfer from.

5.     A student is allowed to transfer once during his university studies, or twice if one of these is the preparatory year or the intensive course of English.

6.     a student transferred to the preparatory year or the intensive course, will be returned to his previous department if he does not pass, only once.

7.     Specialization after passing the preparatory programs is not counted within the transfer movements.

Secondly, transfer of a student from the qualifying programs to the corresponding faculty that awards BA programs within the university is according to the following regulations:

1.     No student may transfer from BA to one of the qualifying programs.

2.     A student is allowed to move to the corresponding faculty, if he finishes all the courses of the qualifying program, with the Grade Point Average 2/5 (two out of five).

3.     If a student completes 50% of the total credit hours of the qualifying program, with a Grade Point Average of 4 to 5, or more, he can transfer to the corresponding faculty.

4.     If a student completes the qualifying program but six hours remain for him, he may transfer to the corresponding faculty, provided, his Grade Point Average is not less than 2.5 to 5.

**Article Forty seven**

All the previously studied courses shall be written in the academic record of the student who transfers from a faculty to another. This includes Grade Point Averages, and Cumulative Grade Point Averages, during his study in the university**.**

# Transfer from Specialization to Another

**Article Forty Eight**

On the approval of the dean, a student may transfer from one specialization to another within the faculty, according to the regulations set by the University Council.

# The Executive Rule of Majmaah University

1.     A student may transfer from one specialization to another within the faculty after the approval of the dean of the faculty, according to regulations set by the Faculty Board.

2.     The remaining period for him in the university should be enough to finish graduation requirements.

3.     Transfer procedures should be completed within the first week of the beginning of the semester or year for the faculties that adopt the annual system. If procedures exceed this period, transfer will be effective the following semester.

4.     A student is allowed to transfer once during his university study.

**Article Forty Nine**

All the previously studied courses shall be written in the academic record of the student who transfers from one specialization to another. This includes Grade Point Averages, and Cumulative Grade Point Averages, during his study in the university**.**

Visitor student   
a visiting student is he who studies some courses in another university or a branch of the same university without transferring to it. The courses he studies are equated according to the following regulations:

1. The student has to get the approval of the faculty in which he intends to study as a visiting student prior to admission.
2. The faculty or the university in which he intends to study should be a recognized institution.
3. The courses to be studied in another university should be equivalent to the requirements of graduation in his university.
4. If the visiting student studies in one of the branches of  the faculty he studies in, he will be treated in accordance with Article (47).
5. The University Council determines the maximum  percentage of credit hours to be considered for the external student.
6. The courses equated for the visiting student are not counted within his CGPA. The courses are written on his academic record.
7. Any other conditions set by the University Council.

# The Operational Rule for Majmaah University

A visiting student is the student who studies some courses in another university or a branch of the same university without transferring to it. The courses he studies are equated according to the following regulations:

Firstly, any student from Majmaah University who wants to study as a visiting student:

1. Bring a prior permission from his faculty allowing him to study as a visiting student, determining the courses he would like to study. The faculty may condition that the student should attain a specific rate for the course equation. He will be given a letter from the Deanship of Admission and Registration to that effect.
2. The student should have an academic record with a (CGPA) for at least one semester in the university, before he applies as a visiting student.
3. The university or the faculty in which he intends to study should be a recognized institution.
4. The course the student intends to study in another university should be equivalent to one of the courses included as part graduation requirements.
5. Taking into account (Article 42), the maximum total for the credit hours to be counted for a visiting student is 20% from the total graduation credit hours in Majmaah University.
6. Equated courses of the visiting student shall not be counted as part of the student's (CGPA). The courses shall, however, be registered in his academic record.
7. The student should inform the Deanship of Admissions and Registration the results he obtains within the first week from the beginning of the semester following his study as a visiting student. If he does not provide his results, he shall be considered absent (except summer courses) and he shall be treated in accordance with (the Article 15).
8. A visiting student shall be paid a monthly bonus if he deserves it through manual files after forwarding his results of the semester to the Deanship of Admission and Registration.
9. The maximum numbers of the semester's students are allowed to study as visitors are two semesters.

Secondly, any student from another university who wants to study in Majmaah University should:

1. Have an academic record with a (CGPA) of one semester at least from the university in which he had been admitted.
2. He should obtain a prior written approval from his university, permitting him to study as a visiting student in Majmaah University. In the letter he should mention the courses of Majmaah University he would like to study.
3. He should get the approval of the faculty in which he wishes to study as a visiting student.
4. The visiting student from another university would not be awarded a bonus from Majmaah University.
5. The courses the student takes are registered by the Deanship of Admission and Registration, taking into account all the regulation of registration.

# Reward students

Is a monthly stipend to students the value of SR 990 in accordance with the following controls:-

1. Low rate student 2

2. Low teaching hours during the semester for 12 hours

|  |
| --- |
| The deanship of admission and registration is responsible for follow-up to the remuneration. |

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**الأصلي**

اعضاء هيئة التدريس بالقسم

# Department Activities

The students' activities aim to promote cultural, social, physical, and scientific activities for students, to achieve the following aims:

* Contribute in preparing university students, and the formation of integrated and balanced personality.
* Supporting islamic education, and guide them to adhere of islamic behavior.
* Refine the students' talent, develop their abilities, and help them to achieve knowledge and beneficial experience.
* Familiarize students with social participation, and develop brotherhood relations among them, and consolidate the relations between them and their teachers.
* Providing comfort and reassurance for students.

# Research and Projects

The student must submit a graduation project as a prerequisite for graduation. Through this project he is putting a summary of what he had acquired from science and skills while studying and also develops his skills in his field during the study and also in practical life after graduation. The department prepared a manual for graduation projects to be a guide for students in all what is related by graduation project , which includes the general conditions for graduation projects - the formal requirements of the project - the rules of admission - the basic elements of the project - specification and format of the report - major parties in graduation projects - success and failure and delay - ways to discuss projects - methods of evaluating projects – FAQs, etc.

The following are some of projects that have been implemented by department students :

1. Digital Library Project
2. Distance-learning project
3. Data encryption
4. Electronic registration of university students
5. Online Auction
6. Data security
7. E-Forms project
8. Electronic fingerprint
9. Incoming and outgoing Project.
10. Car Parts Management System
11. Online testing
12. Hospital appointment booking
13. Airline Reservation System
14. Pharmacy System

# Facilities and Services

Available at the college a range of facilities in order to provide a suitable environment for all students on their various needs. The most important of which are:

1. Refectory

2. College Library

3. Mosque

4. Copying Office

5. High speed Internet

6. Fire extinguisher and first aid box

7. Available corridors suitable for physically disabled as well as vehicles parks.

# Contact Information

|  |  |  |
| --- | --- | --- |
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