Ministry of Higher Education
Kabul Polytechnic University
Faculty of Computer Science

DEPARTMENT OF INFORMATION SYSTEMS (IS)

Undergraduate Curriculum and Syllabus

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Karte Mamourin, Kabul, Afghanistan

Contents

Kabul Polytechnic University

Department of Information Systems

General Introduction

IS – Information Systems is a governmental academic department in the Faculty of Computer Science at Kabul Polytechnic University. IS's predecessor was a department called Information Technology (IT) in which very general principles of Computer Science have been covered since 2008. Later the market demands and the academia have become more professional and specific, it has been decided to develop a new curriculum concentrating more on Information Systems. The aim of the Department of Information Systems is to offer an undergraduate program that supplements the liberal education expected of all Kabul Polytechnic University (KPU) undergraduates and convey a basic understanding of information systems built on a foundation of physical science, mathematics, computing, and technology.

This undergraduate program is expected to possess knowledge of the fundamentals of IS of at least one specialty area. The graduates are expected to have the basic experimental, design, and communication skills to be prepared for continued study at the graduate level or for entry level positions that require a basic knowledge of IS, science, and technology.

Mission

The Department of Information Systems (IS) supports the mission of the Kabul Polytechnic University by providing a high quality undergraduate education to students.

The mission of the IS Department is to provide a learning-centered environment that enables students, faculty, and staff to achieve their goals and to empower our students to compete on a global level for careers in government, industry, secondary education, and acceptance to graduate school.

The Department provides programs in information systems. The curricula are rich with opportunities for students to develop a sound understanding of fundamentals as well as specialized theories, practices, and ethics that enhance their learning.

Goals

- Provide excellent programs in Information Technology and Computer Information systems.
- Prepare graduates for careers enabling them to compete on a global level in government, industry, secondary education, and graduate school acceptance.
- Engage in research and other scholarly activities that enhance, promote, and support degree programs, instructional activities, and intellectual and professional growth of students and faculty.
- Contribute to the body of knowledge in Computer Information systems.
- Provide an environment that promotes collegiality, collaboration, and the joy of learning.

Objectives

- **Technical knowledge**
  Provide a basic knowledge of IS principle along with the required supporting knowledge of mathematics, science, computing, and engineering fundamentals.
- **Laboratory and Design skills**
  Develop the basic skills needed to perform and design software and IS projects. Develop the ability to formulate problems and projects and to plan a process for solution taking advantage of diverse technical knowledge and skills.
- **Communications skills**
  Develop the ability to organize and present information and to write and speak effective English.
- **Preparation for further study**
  Provide sufficient breadth and depth for successful subsequent graduate study post- graduate study, or lifelong learning programs.
- **Preparation for the profession**
  Provide an appreciation for the broad spectrum of issues arising in professional practice, including teamwork, leadership, safety, service, economics, and professional organizations.

The expected outcomes:

On completion of this principle, the students should be able:

- To apply knowledge of mathematics, science, IS and engineering
- To design and conduct experiments, such as to analyze and interpret data
- To function in multi-disciplinary teams
- To identify, formulate, and solve IS problems
- To communicate effectively
- To engage in life-long learning
- To understand contemporary issues
- To apply the techniques, skill, and modern IS tools necessary for engineering practice
- To establish a background for admission to IS, Computer Science and other professional postgraduate program

Subject Categories

In this bachelor degree program, the subjects are divided into four categories according to the requirements of Ministry of Higher Education (MoHE), Afghanistan. The categories along with their required percentage in overall degree program, which is provided by the MoHE is given below.

- General Subject (should be less than 12% of the overall degree credits.)
- Basic Subjects (should be less than 30% of the overall degree credits.)
- Core Subjects (should be more than 50% of overall degree credits)
- Project (should be more than 8% of overall degree credits)

The details of each category is given below.

General and Elective Subjects

General Subjects

The subjects in General Category are the subjects which have been included in the curriculum as an extra support for the specialization subjects. General category includes subjects which are added by the university authority along with the elective subjects in the entire degree program.

No	Subject	Code	Semester	Credit	Pre-Requisite
1	Islamic Studies-1	CO101	1	1	
2	Modern History1	CO102	1	1	
3	General English 1	EL101	1	2	
4	Islamic Studies – 2	CO201	2	1	
5	Modern History of Afghanistan – 2	CO202	2	1	
6	Islamic Studies – 3	CO301	3	1	
7	Islamic Studies – 4	CO401	4	1	
8	Islamic Studies – 5	CO501	5	1	
9	Islamic Studies – 6	CO601	6	1	
10	Islamic Studies – 7	CO701	7	1	
11	Islamic Studies – 8	CO801	8	1	
Total				**12**	

Elective Subjects:

The elective subjects are included in the general subjects' category. The subjects in first two years of degree programs are given below.

No	Subject	Code	Semester	Credit	Pre-Requisite
1	Elective -1		1	1	
2	Elective -2		5	3	
3	Elective -3		8	2	
Total				5	

Basic Subjects:

The subjects in BASIC Category are the subjects which provides basis and build up foundation for the specialized subjects.

No	Subject	Code	Semester	Credit	Pre-Requisite
1	Introduction to Programming	CS101	1	4	
2	Introduction to Programming 2	CS201	2	4	CS101
3	Computer Fundamental	CS103	1	3	
4	Computer Skills	CS102	1	3	
5	Calculus-1	EL102	1	3	
6	Calculus-2	EL202	2	3	
7	General English2	EL201	2	2	
8	Discrete Mathematics	CS202	2	3	
9	Network Fundamental	CS302	3	3	
10	Technical English	EL301	3	2	
11	Probability and statistics	EL302	4	3	
12	Computer Networks	CS402	3	2	CS302
13	Diploma Project Guide	CS723	7	1	
14	Academic Writing	EL401	4	2	EL301
Total				**38**	

Project Subjects:

The subjects in Project Category are the subjects which are directly related to the implementation of knowledge acquired in previous semesters. The students are required to work individually or in small groups to complete a project which is assigned to them or have been selected by the students themselves.

No	Subject	Code	Semester	Credit	Pre-Requisite
1	Educational Practice	CS503	5	2	
2	Productive Practice (Internship)	CS601	6	2	
3	Diploma Project	CS801	8	12	
Total				14	

Core Subjects:

The subjects in Core Category are the subjects which are directly related to the specialized fields of this degree program. These subjects are the main subjects of telecommunication engineering and are consist of the largest portion of credits.

No	Subject	Code	Semester	Credit	Pre-Requisite
1	Fundamental of Information System	CS205	2	3	
2	System Analysis and Design	CS305	3	3	
3	Object Oriented Programming	CS301	3	3	
4	Fundamental of Web Design	CS2012	3	3	
5	Data Structures and Algorithms	CS401	4	3	CS301
6	IT Project Management	CS408	4	3	
7	Fundamental of Database	CS407	4	3	
8	Web Development	CS404	4	3	
9	Web Development 2	CS507	5	3	CS404
10	System Administration and Maintenance	CS506	5	3	
11	Java Programming	CS502	5	3	
12	Database 2	CS526	5	3	
13	Operating System Concept	CS501	5	3	
14	Distributed Web	CS606	6	3	
15	HCI	CS609	6	3	

16	Data Warehouse	CS612	6	3	
17	Information Security Management	CS603	6	3	
18	Cloud Computing	CS617	6	3	CS501
19	Research Methodology	CS701	7	2	
20	Mobile Application Development	CS702	7	3	
21	Web Application Security	CS704	7	3	
22	Advance Database Management System	CS713	7	3	
23	IS Strategy, Management & Acquisition	CS717	7	3	
24	Design Pattern	CS706	7	3	
25	Advance Mobile Application Development	CS802	8	3	
Total				74	

Summary of Overall Credits

Subjects	Credits	Percentage	Criteria of MoHE
General	12	8,39%	
Elective	5	3,49%	
Total General and Elective	17	11.89%	< 12%
Basic	38	26.57%	< 30%
Projects	14	9.79%	> 8%
Core	74	51.75%	> 50%
Total Credits	143	100%	> 136 and < 168

Semester Wise Syllabus

KABUL POLYTECHNIC UNIVERSITY
Department of Information System
Semesters-wise Syllabus

First Year (First Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Introduction to Programming	CS101	Basic	4	2	4	-	6	IS	-
2	Computer Fundamental	CS103	Basic	3	2	2	-	4	IS	-
3	Computer Skills	CS102	Basic	3	2	2	-	4	IS	
4	Islamic Culture-1	CO101	General	1	1	-	-	4	IC	-
5	Modern History-1	CO102	General	1	1	-	-	1	IC	-
6	General English 1	EL101	General	2	-	4	-	4	FL	-
7	Calculus - I	EL102	Basic	3	2	2	-	4	MA	-
8	Elective-1		Optional	1	-	-	-	-	-	-
Total				18	10	14	4	28	-	-

No	Elective - 1	Code	Number of Hours				Teaching Department	Prerequisite
1	IPS	CS104	1	-	-	1	IS	-
2	Communicational Skills	CS105	1	-	-	1	IS	-

Subject Category	Credit	Percentage
General	5	3.40
Basics	13	8.84
Core	0	0.00
Total	18	12.24

First Year (Second Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Introduction to Programming 2	CS201	Basic	4	2	4	-	6	IS	
2	Discreet Mathematics	CS202	Basic	3	2	-	2	4	MA	
3	Islamic Culture-2	CO201	General	1	1	-	-	1	IC	
4	Modern History of Afghanistan	CO202	General	1	1	-	-	1	IC	
5	General English 2	EL201	Basic	2	-	4		4	FL	
6	Calculus – II	EL202	Basic	3	2	2		4	MA	
7	Fundamental of Information System	CS205	Core	3	2	2	-	-	IS	
Total				17	12	8	8	28	-	-

Subject Category	Credit	Percentage
General	2	1.36
Basics	12	8.16
Core	3	2.04
Total	17	11.56

Second Year (Third Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	System Analysis and Design	CS305	Core	3	2	2		4	IS	
2	Object Oriented Programming	CS301	Core	3	2	2		4	SE	
3	Fundamental of Web Design	CS212	Core	3	2	2		4	IS	
4	Islamic culture-3	CO301	General	1	1	-		1	IC	
5	Network Fundamental	CS302	Basic	3	2	2		4	CCE	
6	Technical English	EL301	Basic	2		4		4	FL	
7	Probability and statistic	EL302	Basic	3	2	2		4	MA	
Total				18	11	14		25		

Subject Category	Credit	Percentage
General	1	0.68
Basics	8	5.44
Core	9	6.12
Total	18	12.24

Second Year (Fourth Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Data Structure and Algorithm	CS401	Core	3	2	2		4	SE	
2	IT Project Management	CS408	Core	3	2	2		4	IS	
3	Computer Networks	CS402	Basic	3	2	2		4	CCE	
4	Fundamental of Database	CS407	Core	3	2	2		4	IS	
5	Web Development	CS404	Core	3	2	2		4	IS	
6	Islamic Culture -4	CO401	General	1	1			2	IC	
7	Academic Writing	EL401	Basic	2		4		4	FL	
Total				18	11	14		25		

Subject Category	Credit	Percentage
General	1	0.68
Basics	5	3.40
Core	12	8.16
Total	18	12.24

Third Year (Fifth Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Web Development 2	CS507	Core	3	2	2		4	IS	
2	System Administration and Maintenance	CS506	Core	3	2	2		4	NTE	
3	Java Programming	CS502	Core	3	2	2		4	SE	
4	Database 2	CS526	Core	3	2	2		4	IS	
5	Educational Practice	CS503	Project	2			2	2	IS	
6	Operating System Concept	CS501	Core	3	2	2		4	NTE	
7	Islamic Culture-5	CO501	General	1	1			1	IC	
8	Elective - 2		Optional	3						
Total				21	11	10	2	23		

NO	Elective - 2	Code	Number of Hours				Teaching Department	Prerequisite
			Lecture	Practical	Stage	Total Hours		
1	Software Engineering	CS515	2	2		4	SE	
2	Enterprise Architecture	CS508	2	2		4	IS	
4	Recommender System	CS530	2	2		4	IS	

Subject Category	Credit	Percentage
General	4	2.72
Core	15	10.20
Project	2	1.36
Total	21	14.29

Third Year (Sixth Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Distributed Web	CS606	Core	3	2	2		4	IS	
2	HCI	CS609	Core	3	2	2		4	IS	
3	Data Warehouse	CS612	Core	3	2	2		4	IS	
4	Information Security Management	CS603	Core	3	2	2		4	SE	
5	Productive Practice	CS601	Project	2			4	4	IS	
6	Islamic Culture 6	CO601	General	1	1			1	IC	
7	Cloud Computing	CS617	Core	3	2	2		4	IS	
Total				18	11	10	4	25		

Subject Category	Credit	Percentage
General	1	0.68
Basics	0	0
Core	15	10.20
Project	2	1.36
Total	18	12.24

Fourth Year (Seventh Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Research Methodology	CS701	Core	2	1		2	3	CCE	
2	Mobile Application Development	CS702	Core	3	2	2		4	IS	
3	Application Security	CS704	Core	3	2	2		4	SE	
4	Advance Database Management system	CS713	Core	3	2	2		4	IS	
5	Islamic Culture	CO701	General	1	1			1	IC	
6	IS Strategy, Management & Acquisition	CS712	Core	3	2	2		4	IS	
7	Diploma Project Guide	CS723	Basic	1			1	1	IS	
8	Design Pattern	CS706	Core	3	2	2		4	IS	
Total				19	12	10	3	25	-	-

Subject Category	Credit	Percentage
General	1	0.68
Basics	1	0.68
Core	17	11.56
Total	19	12.93

Fourth Year (Eighth Semester)

No	Subject	Code	Category	Credit	Lecture	Practical	Stage	Total Hours	Teaching Department	Prerequisite
1	Diploma Project	CS801	Project	12	4		24	28	IS	
2	Advance Mobile Application Development	CS802	Core	3	2	2		4	IS	
3	Islamic Culture 8	CO801	General	1	1			1	IC	
4	Optional			2	1	2	24	3		
Total				18	3	28	-	36	-	-

NO	Elective - 3	Code	Number of Hours				Teaching Department	Prerequisite
			Lecture	Practical	Stage	Total Hours		
1	Distributed Database	CS811	1	2		3	IS	
2	E-commerce	CS808	1	2		3	SE	
3	Big Data	CS815	1	2		3	IS	

Subject Category	Credit	Percentage
General	3	2.04
Core	3	2.04
Project	12	8.16
Total	18	12.24

Details of Syllabus

General Subjects

Subject: General English1 – EL101

Class& Semester: 1st year , 1st Semester			
Credits: 2 Credits **Hours:** 2 Joint-hours every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Class Activities and Homework		10
2	Mid-term exam		20
3	Assignment or Project		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Interchange 2	Jack C. Richards (2013)	4thCambridge University Press
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Practical English Usage	Swan, Micheal	3rd Oxford University Press
2	Skill Worker	Mir, SurriyaShaffi; Mansoor, Sabiha; Irfan, Humaira	1st Baffalo Inc. Press

Course Description:

This course aims at enhancing students' ability in four skills (reading, Writing, Listening and speaking) to communicate effectively, to read comprehensively, to enhance students' knowledge of grammatical structures of English language and giving them new insight into words, sentence structure, and essential aspects of nonverbal communication.

Course Objectives:

The objective of the course is to enhance students' basic knowledge about four skills of English language.

Learning Outcomes:

At the end of this course, Students will be able to:

- To introduce themselves and use simple present tense.
- Recognize and analyze basic parts of speech and craft effective sentences in English language
- to describe positive and negative features using degree of adjectives
- to make polite request, using model and would you mind
- to give suggestion
- to interpret body language

Detailed Course Outline:

Week No.	Topics
1	Course Introduction
2	A time to Remember
3	Caught in the Rush
4	Time for a change
5	Going places
6	Let's Celebrate
7	Times have Changed
8	**Midterm Exam**
9	I hate working on Weekend
10	What happened?
11	What's your Excuse
12	What would you do?
13	It's really worth seeing!
14	Students Presentation
15	Students Presentation
16	**Final Exam**

Subject: Contemporary History of Afghanistan – CO102

Class & Semester: 1st year , 1st Semester			
Credits: 1 Credits **Hours:** 1 hour			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	30	
2	Final exam	70	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	افغانستان در مسیر تاریخ	غلام محمد غبار	
2	افغانستان در مسیر تاریخ	صدیق ف فرهنگ	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	تاریخ مختصر افغانستان	محمد ابراهیم عطایی	

Course Description:
Afghanistan Contemporary History has been considered important for students of universities across the country. It has to be taught for two semesters (semester first and second). This course has been defined by department of history and is planed according to below table.

Couse Objectives:
The contemporary history of Afghanistan should be taught to students in two semesters by department of history.

Learning Outcomes:
At the end of the course, you would be able to:

- Undersetting the historical facts in the course of history
- Analyzing facts and gain clear insight about history
- Use their historical understanding fairly in their life

Detailed Course Outline:

Week No.	Topics
1	General information, definitions, historical divisions,
2	Afghanistan historical geography
3	Afghanistan borders
4	Introduction to history of neighbor countries
5	Afghanistan situation at the time foreigners occupation
6	Afghanistan situation before Ahmad Sha Abdali
7	Dorani's and rehabilitation of Afghanistan
8	**Midterm Exam**
9	Kingdom of Temorsha
10	Kingdom of Zamansha
11	First term of Kingdom of Sha Mahmood
12	First Kingdom of Sha Shoja
13	Second term of Kingdom of Sha Mahmood
14	Transition of kingdom from Sadozia to Barikzai
15	Rule of Amir Dost Mohammad Khan
16	**Final Exam**

Subject: Contemporary History of Afghanistan – CO202

Class & Semester: 1st year , 2st Semester			
Credits: 1 Credits **Hours:** 1 hour			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	30	
2	Final exam	70	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	افغانستان در مسیر تاریخ	غلام محمد غبار	
2	افغانستان در مسیر تاریخ	صدیق ف فرهنگ	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	تاریخ مختصر افغانستان	محمد ابراهیم عطایی	

Course Description:
Following course of Afghanistan Contemporary History has been considered important for students of universities across the country. It has to be taught for two semesters (semester first and second). This course has been defined by department of history and is planed according to below table.

Couse Objectives:
The contemporary history of Afghanistan should be taught to students in two semesters by department of history.

Learning Outcomes:
At the end of the course, you would be able to:

- Undersetting the historical facts in the course of history

- Analyzing facts and gain clear insight about history
- Use their historical understanding fairly in their life

Detailed Course Outline:

Week No.	Topics
1	British first Invasion to Afghanistan
2	Second term of Emarate of Dost Mohammad khan
3	First Emarate of Amir Shir Ali Khan
4	Kingdom of Amir Mohammad Afzal Khan
5	Kingdom of Amir Mohammad Azam khan
6	Second Kingdom of Amir Shir Ali Khan
7	Kingdom of Amir Mohammad Yaqoob Khan (Gandomak's inclusion of treaty)
8	**Midterm Exam**
9	Kingdom of Amir Aburahman Khan (determining borders and Duran Line)
10	Kingdom of Amir Habibullah Khan
11	Kingdom of Amanullah Khan
12	Kingdom of Amir Habibullah Kalakani
13	Kingdom of Nadirsha
14	Kingdom of Zahir Sha
15	Dawood Khan first Republic Government in Afghanistan
16	**Final Exam**

Subject: Islamic culture1 - CO101

Class & Semester: Year 1st, 1st Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	تعالیم اسلام	علی طنطاوی ترجمه خلیل احمد حامدی,	انتشارات, دارالعروبه للدعو الاسلامی, منصوره, لاهور, پاکستان.
2	عقاید اسلامی, مرکز	سید سقایق سابق , ترجمه: علی آقا صالحی	نشراتی میوند, 1380 چاپ اول, نشر احسان, چاپ خانه پیام.
3	جهان بینی اسلامی	جعفر سبحانی	
4	اسلام دین فطرت	سعید حوی, مترجم, مومن حکیم,	مرکز نشراتی پیغام؛ بازار قصه خوانی

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.

- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.
- Muslims belief and faith on intellectual thought and this belief, will complete his/ her adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.
- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	General information about Islamic culture
2	General information about Islamic culture
3	Understanding of belief
4	Understanding of belief
5	Oneness(monotheism)
6	Oneness(monotheism)
7	Belief in the unseen
8	Belief in the unseen
9	Idolatry(creature worship)
10	Idolatry(creature worship)
11	Idolatry(creature worship)
12	Anthropology in Islamic worldview
13	Anthropology in Islamic worldview
14	Anthropology in Islamic worldview
15	Review
16	**Final Exam**

Subject: Islamic culture2 - CO201

Class & Semester: Year 1st, 2nd Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Quiz		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	شعب الايمان	البيهقى, ابوبكر احمد بن الحسين	بيروت دارالكتب العلميه الطبعه
2	الاحكام الشرعيه اكبرى	البيهقى, ابو محمد عبدالحق	الرياض: مكتبه الرشد.
3	ماذا خسرالعام بانحطاط المسلمين	ندوى, ابوالحسن.(ب ت)	چاپ دوم
4	الحكام الشرعيه الكبرى	الاشبيلى, ابو محمد عبدالحق	الرياض: مكتبه الرشد
5	بررسى ادوار تاريخ	جهيد, عبدالواحد. (ب ت)	

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.
- Muslims belief and faith on intellectual thought and this belief, will complete his/ her

adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.

- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	Philosophy of prayers
2	Philosophy of prayers
3	Definition of worship and kinds of worships
4	Definition of worship and kinds of worships
5	Wisdom of uttering prayer according to Islam's vision
6	Wisdom of uttering prayer according to Islam's vision
7	Fasting and Ramada's wisdom according to Islam's vision
8	Midterm Exam
9	Zakat's wisdom according to Islam's vision
10	Zakat's wisdom according to Islam's vision
11	Hajj's wisdom according to Islam's vision
12	Hajj's wisdom according to Islam's vision
13	Wisdom of calling for goodness and preventing from badness
14	Wisdom of calling for goodness and preventing from badness
15	Innovation in religion and its consequences
16	**Final Exam**

Subject: Islamic culture3 - CO301

Class & Semester: Year 2nd , 3rd Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	تهذیب الاخلاق	الحسین عبدالحی	مطبعه المیامه دمشق. بیروت بت
2	سوی الخلق, مظاهر- اسباب و علاجه	الاحمد, محمد بن ابراهیم	طبع: دار ابن خزیمه. طبعه الالثه.
3	الاخلاق فی شریعه الاسلامیه	احمد علیان	ناشر: زیاض. دارانشر ادولی. الطبق: 1420.
4	اخلاق مسلمان	محمد غزالی. مترجم مومن حکیمی.	ناشر: مکتبه علم و فرهنگ. شماره چاپ دوم

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.

- Muslims belief and faith on intellectual thought and this belief, will complete his/ her adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.
- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	Moral system of Islam
2	Moral system of Islam
3	Moral system of Islam
4	Understanding Islamic moral
5	Understanding Islamic moral
6	Courtesy and ethics with God and his prophet
7	Courtesy and ethics with God and his prophet
8	Midterm Exam
9	Good morals in Islam
10	Good morals in Islam
11	Good morals in Islam
12	Moral corruptions in Islam's view
13	Moral corruptions in Islam's view
14	Moral corruptions in Islam's view
15	Review
16	**Final Exam**

Subject: Islamic culture4 - CO401

Class & Semester: Year 2nd, 4th Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	اخلاق اسامی و آداب اجتماعی	وثیق. نعمت الله	
2	الاحکا السلطانیه	الوالحسن الماوردی	
3	خلافت و ملوکیت	ابوالاعلی مودودی	
4	سیاست اسلامی	گوهر رحمان	
5	تاریخ الامم و الملوک	محمد بن جریر طبری	
6	دور نمای جامعه اسلام	یوسف قرضاوی	نشر احسان, تهران چاپ دوم

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.
- Muslims belief and faith on intellectual thought and this belief, will complete his/ her

adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.

- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	Political System of Islam
2	Political System of Islam
3	Political System of Islam
4	General in knowing politics and history of political think
5	General in knowing politics and history of political think
6	Recognition of governments
7	Recognition of governments
8	Midterm Exam
9	Council or the legislature
10	Judiciary
11	Judiciary
12	Executive and defence force
13	Executive and defence force
14	Islam and democracy
15	Islam and democracy
16	**Final Exam**

Subject: Islamic culture5 - CO501

Class & Semester: Year 3rd, 5th Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Quiz		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	اصول دعوت	عبدالکریم زیدان, مترجم: مومن حکیمی	نشر احسان, چاپ خانه مهارت. چاپ اول 1382
2	اسلام شناس	سعید حوی, مترجم, فضل من الله فضلی	ناشر, اداره الهدا, مکتبه نظیر افکار, قصه خوانی پشاور.
3	حقوق بشر در اسلام	عبداللطیف بن سعید عامدی	
4	دستتاورد های تمدن اسلامی و نقش آن در رنسانس	عبدالله ناصح علوان	نشر احسان, چاپ مهارت. چاپ اول

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.

- Perform his/her role as a peacemaker human in the society.
- Muslims belief and faith on intellectual thought and this belief, will complete his/ her adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.
- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	Social System of Islam
2	Introduction
3	Features of Islamic social
4	The basis of social relationships between individuals in society
5	The basis of social relationships between individuals in society
6	Family and its characteristics
7	Family and its characteristics
8	Family formation steps
9	Midterm Exam
10	The dissolution of the marriage and of the marriage live and its consequences
11	Public and private tights of family members
12	Public and private tights of family members
13	Members of the community's relationship with Muslims living non -Muslims communities
14	Social instructions of Islam in dealing with the new phenomenon
15	Social instructions of Islam in dealing with the new phenomenon
16	**Final Exam**

Subject: Islamic culture6 - CO601

Class & Semester: Year 3rd, 6th Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	فرهنگ و تمدن اسلام,	علی اکبر ولایتی	ناشر: دفتر نشر معارف, چاپ: پنجم 1386
2	حقوق بشر در اسلام.	عبدالطیف بن سعید غامدی	
3	ویژگی های ایدیولوژی اسلامی.	سید قطب, (1369) ترجمه، سید محمد خامنه ای	نشر موسسه کیهان

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.
- Muslims belief and faith on intellectual thought and this belief, will complete his/ her adherence to Islam as a comprehensive system, it will be a factor of development of him in all

aspects of live.

- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	Islamic Civilization
2	Islamic Civilization
3	Resources and support of Islamic civilization
4	Resources and support of Islamic civilization
5	Various aspects of Islamic civilization and its impact on the structure of nations and communities
6	Transmission ways of culture and Islamic civilization and wester's praise from it
7	The "human" factor in Islamic civilization
8	Midterm Exam
9	Transmission ways of culture and Islamic civilization and wester's praise from it
10	The impact of Islamic civilization on western civilization
11	Externa and internal causes of the Islamic civilization
12	Externa and internal causes of the Islamic civilization
13	The reason of Islamic culture and civilization falling
14	The reason of Islamic culture and civilization falling
15	The Islamic awakening in Islamic world
16	**Final Exam**

Subject: Islamic culture7 - CO701

Class & Semester: Year 4th , 7th Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	اسلام آیین زندگی	محمد شلتوت ,مترجم, عبدالعزیز	مهارت, چاپ اول
2	ویژگی های کلی اسلام	یوسف قرضاوی مترجم جلیل بهرامی نیا.	نشر احسان, چاپ دوم
3	ضرورت به سلام	محمد یوسف ,موسی ترجمه, نعمت الله شهرانی	کابل: انتشارات الازهر

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.
- Muslims belief and faith on intellectual thought and this belief, will complete his/ her

adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.

- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	General Characteristics of Islam
2	General Characteristics of Islam
3	Understanding Islam religion
4	Divinity of Islam
5	Divinity of Islam
6	Humanity in Islam
7	Comprehensiveness and perfection of Islam
8	Midterm Exam
9	Moderation balance in Islam
10	Moderation balance in Islam
11	Realism in holy religion of Islam
12	Realism in holy religion of Islam
13	Transparency in Islam
14	Establishing balance between modernism and traditionalism
15	Establishing balance between modernism and traditionalism
16	**Final Exam**

Subject: Islamic culture8 - CO801

Class & Semester: Year 4th , 8th Semester			
Credits: 1 **Type:** **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	کتاب قرآن و ساینس جدید	ذاکر نایک	
2	کتاب اعجاز قرآن در پرتو ساینس و تکنالوژی معاصر	یحی هارون	
3	کتاب اعجاز قرآن در عصر فضا و تکنالوژی	روحانی کمال	
4	کتاب موسوعه الاعجاز العلمی فی القرآن الکریم و السنه التبویه	جاد احمد	

Couse Objectives:

In this course the student will gain knowledge of the origin and history of the Islamic culture and afterwards will be able to apply the values of Islamic culture to the everyday life.

Learning Outcomes:

On successful completion of this module, the students is able to:

- Understand and discuss religious values of the community
- Committing these values.
- Easy acceptance and more eagerness of worships in different aspects of life.
- Knowledge in Islamic political ideas beside the modern technologies and recent educations.
- Creation of an Islamic, healthy, righteous and developed society in which the members,
- Live next to each other with a good, brotherhood, peaceful and human based environment.
- Know their jobs and rights in the society.
- Perform his/her role as a peacemaker human in the society.

- Muslims belief and faith on intellectual thought and this belief, will complete his/ her adherence to Islam as a comprehensive system, it will be a factor of development of him in all aspects of live.
- Strong believe that Quran is the Allah's words, Quran is the unique tool for deliverance from all adversities and bad lucks, and Quran is the heeling prescription for all kind of diseases.
- Belief in the truth of Islam and create a spirit of commitment and adherence to its instructions.
- Understand the ethical commitment of engineers.

Detailed Course Outline:

Week No.	Topics
1	Quran and modern technology
2	Quran and modern technology
3	Generals in recognition of miracle
4	Historical miracle of Quran
5	Historical miracle of Quran
6	The medical miracle of Quran
7	Quran's miracle in geologies
8	Midterm Exam
9	Quran's miracle in astronomy
10	Quran's miracle in astronomy
11	Quran's miracle in agriculture and zoology
12	Quran's miracle in agriculture and zoology
13	N's miracle in Hydrometeorology
14	Mathematical miracle of Quran
15	N's miracle in Hydrometeorology
16	**Final Exam**

Elective Subjects

Subject: Introduction to Professional Studies (IPS) – CS104

Class & Semester: Year 1, 1st Semester			
Credits: 1 Credits **Category:** Optional **Lab hours :** 1 hour-session in a week 45 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments/ Homework/Class Attendance/Group Project		NA
3	Final exam		80
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**IT Department Curriculum, Afghanistan Credit System guidelines, Higher Education Law, …**		
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			

Course Description:

Introduction to Professional Study (IPS) is designed to introduce students with their field of study, Afghanistan higher education system, higher education law and procedures.

Course Objectives:

The objectives of the course is to familiarize students with higher education laws and procedures and to enable students to understand their roles, responsibilities and their rights and privileges.

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	Introduction to course
2	History of KPU Introduction to KPU, Computer Science faculty and IS department.
3	IS curriculum
4	Introduction to Credit system in Afghanistan
5	Credit system
6	Credit System
7	Credit System
8	Mid Term Exam
9	Exam procedure
10	Exam procedure
11	Afghanistan higher education law
12	Student's roles and responsibilities in Afghanistan higher education law
13	An introduction to IT
14	Job opportunities in IT and IS
15	Course Review
16	Final Term Exam

Subject: Communication Skills (CS) – CS105

Class & Semester: Year 1, 1st Semester			
Credits: 1 Credits **Category:** Optional **Lab hours :** 1 hour-session in a week 45 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments/ Homework/Class Attendance/Group Project		NA
3	Final exam		80
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			

Course Description:

Communication influences all factors of your life. From daily interactions with strangers on the street to the way you present yourself in the board room, the way you communicate is a reflection of who you are and the way you establish relationships with those around you.

Course Objectives:

This course will not require you to have previous experience in any particular area but you should have a high school reading level. No books will be required.

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	**Recognizing and Understanding Communication Styles**
2	Verbal Communication
3	Nonverbal Communication
4	Communicating in Writing
5	Cultivating Conversational Skills
6	Group Communication
7	Communications Technology
8	Mid Term Exam
9	Barriers to Communication
10	Cultural Aspects of Communication
11	Disagreements and Conflicts
12	Negotiation
13	Constructive Criticism
14	Group Communication
15	Course Review
16	Final Term Exam

Subject: Software Engineering – CS515

Class & Semester	Year 3nd , 5th semester		
Credits: 3 credits Category: Core Lecture hours: 2 hours lecture and 2 hours practice			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Evaluation	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	System Analysis & Design in a changing world	John Satzinger	6th Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Just Enough requirements management: Where software development meets marketing	Alan M. Davis	2nd Edition
2	Introduction to digital systems: Modeling, Synthesis, and Simulation using VHDL	John Wiley and Sons	1st Edition

Course Description:

This course introduces students the concept of IT management, explain its features and importance and explain how IT supports business requirements in today's competitive environment and describe major IT trends. Describe systems analyst job and show students how to use various tools and techniques to improve their skills and manage their careers, and to emphasize on the importance of planning.

Objectives:

The goal of the subject is to familiarize students with basic principles of development, operation and management of a company's IS based on modern information technologies. In tutorials, students will gain experience in business process modeling and in IT project definition. They will solve sampled analytical activities from an IT project in a team.

Learning Outcomes:

Upon successful completion of this course attendees will be able to:

- Understand the software needs of an organization and develops a computer program as per organization needs.
- Understand the life cycle of software project.
- Apply the most appropriate development process to produce software-based solution as per needs of the organization.
- Performs software maintenance and provide adequate support to the organization.
- Understanding of software life cycle and process models.
- To be able to utilize basic techniques in software development.
- To deepen an understanding of the environment that surrounds software projects.

Detailed Course Outline:

Week No.	Topics
1	Lesson 1: Basic Principles (Introduction)
2	Lesson 2: Software and Software Engineering
3	Lesson 3: Software Development Processes
4	Lesson 4: Project Management Processes
5	Lesson 5: Requirements Analysis
6	Lesson 6: Software Design Techniques
7	Lesson 7: Software Testing
8	Mid Term Exam
9	Lesson 8: Software Quality
10	Lesson 9: Unified Modeling Language (UML)
11	Lesson 10: Object-Oriented Methodology
12	Lesson 11: Exercises in Analysis and Design
13	Lesson 12: Exercises in Analysis and Design
14	Lesson 13: Exercises in Analysis and Design
15	Lesson 14: Summary and the Latest Topics
16	Final Exam

Subject: Enterprise Architecture (EA) – CS 508

Class & Semester: Year 3, 5th Semester			
Credits: 3 Credits **Category:** Elective **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			

Course Description:

This course explores the design, selection, implementation and management of enterprise IT solutions. The focus is on applications and infrastructure and their fit with the business. Students learn frameworks and strategies for infrastructure management, system administration, data/information architecture, content management, distributed computing, middleware, legacy system integration, system consolidation, and software selection, total cost of ownership calculation, IT investment analysis, and emerging technologies. These topics are addressed both within and beyond the organization, with attention paid to managing risk and security within audit and compliance standards.

Students also hone their ability to communicate technology architecture strategies concisely to a general business audience.

Course Objectives:

The students are expected to learn the following objectives.

- Understand a variety of frameworks for enterprise architecture analysis and decision making.
- Evaluate the total cost of ownership and return on investment for architecture alternatives.

- Utilize techniques for assessing and managing risk across the portfolio of the enterprise.
- Evaluate and plan for the integration of emerging technologies.
- Administer systems, including the use of virtualization and monitoring, power and cooling issues.
- Manage proliferating types and volume of content.
- Understand the core concepts of data/information architecture and evaluate existing data/information architecture designs.
- Plan for business continuity.
- Understand the benefits and risks of service oriented architecture.
- Understand the role of audit and compliance in enterprise architecture.
- Understand the integration of enterprise systems with interorganizational partners such as suppliers, government, etc.

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	Service oriented architecture
2	Enterprise architecture frameworks
3	Systems integration
4	Enterprise resource software
5	Monitoring and metrics for infrastructure and business processes
6	Green computing
7	Virtualization of storage and systems
8	Mid Term Exam
9	The role of open source software

10	Risk management
11	Business continuity
12	Total cost of ownership and return on investment
13	Software as a service
14	Content management
15	System administration
16	Final Term Exam

Subject: Distributed Database – CS811

Class & Semester: Year 4, 8th Semester

Credits: 2 Credits
Category: Elective 2
Lab hours : 3 hour-session in a week 135 minutes

EVALUATION

S. No	Quizzes and exams	Mark distribution
1	Mid-term exam	20
2	Assignments/ Homework/Class Attendance/Group Project	20
3	Final exam	60

Reference Book

S. No	Book Name	Author(s) Name	Publisher Name & Edition
1	**Principles of Distributed Database Systems**	M. Tamer Özsu & Patrik Vlanduriez	Springer Science & Business Media; 3th edition (2011)

Recommended Books

S. No	Book Name	Author(s) Name	Publisher Name & Edition
1	**Distributed Database Systems**	Bell David & Jane Grimson	Addison-Wesley;1th edition (1992)
2	**Distributed Database Systems**	Chhanda Ray	Pearson Education; 1th edition (2012)
3	**Distributed Database System**	Nakamatsu Yoshiki	U.S. Patent; 1th edition (2003)

Course Description:

This course introduces the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems.

Course Objectives:

On successful completion of this course, students will be able to

- Examine the basic components of a Distributed Database System
- Validate the Types and Properties of Transactions
- Evaluate Concurrency Control Algorithms
- Understand reliability concepts and measures in the context of Distributed Databases
- Explain the generic Architecture of a Parallel Database and an Object Database System
- Construct an interface for a database application

Homework and class activity details

Throughout the semester the students are expected to be able to manage the large volume of shared data in a distributed environment. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	Introduction
	Distributed data processing; What is a DDBS; Advantages and disadvantages of DDBS; Problem areas; Overview of database and computer network concepts
2	Distributed Database Management System Architecture
	DBMS Standardization
	Architectural Models for DDBM's
3	Distributed Database Design
	Alternative Design Strategies & Design issues
	Fragmentation & Allocation
4	Semantic Data Control
	View Management
5	Security
	Integrity Control

6	Overview of Query Processing
	Processing Problems
	Complexity of relational
	Characterization of Query
	Processors Layers of Query Processing
7	Query Decomposition
	Query Decomposition & Localization of Distributed Queries
8	**Mid Term Exam**
9	Optimization of Distributed Queries
	Query Optimization
	Centralized Optimization
	Join Ordering in Fragment Queries
	Optimization Algorithms
10	Introduction to Transaction Management
	Definition, Properties and Types of Transactions
11	Distributed Concurrency Control
12	Distributed DBMS Reliability
13	Parallel Database Systems
14	Distributed Objects Database Management Systems
15	Database Interoperability
	Database Integration
	Query Processing
	Transaction Management
	Object Orientation and Interoperability
16	**Final Term Exam**

Subject: Big Data – CS815

Class & Semester: Year 4, 8th Semester			
Credits: 3 Credits **Category:** Elective 1			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Big Data: Principles and best practices of scalable realtime data systems	Marz, Nathan, and James Warren	Manning Publications Co., 2015.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data	EMC Education Services	John Wiley & Sons, 2015
2			
3			

Course Description:

In today's world enterprises are flooded with massive amount of data from numerous sources like on-premises applications, cloud, location services, social and IoT devices. Enterprises can leverage this data to learn more about their customers, markets, partners and employees, enabling them to generate new revenue streams.

Course Objectives:

On successful completion of this module, students will be able to:

- Gain insights on how to run better businesses and provide better service to customers.

- Get recommendations on how to process big data on platforms that can handle the variety, velocity, and volume of data by using a family of components that require integration and data governance.
- Learn why Big Data is NoHadoop ("not only Hadoop") as well as NoSQL ("not only SQL").

Homework and class activity details

As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	Introduction to Big Data
	Introduction to Big Data, Big Data characteristics, types of Big Data
	Traditional vs. Big Data business approach, Case Study of Big Data Solutions.
2	Introduction to Hadoop
	Hadoop Ecosystem
3	Physical Architecture, Hadoop limitations
	What is NoSQL? NoSQL business drivers; NoSQL case studies;
4	NoSQL data architecture patterns: Key-value stores, Graph stores, Column family (Bigtable) stores, Document stores, Variations of NoSQL architectural patterns;
	Using NoSQL to manage big data:- What is a big data NoSQL solution? Understanding the types of big data problems; Analyzing big data with a shared-nothing architecture; Choosing distribution models: master-slave versus peer-to-peer; Four ways that NoSQL systems handle big data problems
5	MapReduce and the New Software Stack
	Distributed File Systems
6	**MapReduce**
	Algorithms Using MapReduce
	Finding Similar Items
7	Applications of Near-Neighbor Search, Jaccard Similarity of Sets, Similarity of Documents, Collaborative Filtering as a Similar-Sets Problem
	Mining Data Streams
	The Stream Data Model
8	Mid Term Exam
9	Sampling Data in a Stream Obtaining a Representative Sample, The General Sampling Problem, Varying the Sample Size.
	Filtering Streams

	The Bloom Filter, Analysis.
	Counting Distinct Elements in a Stream The Count-Distinct Problem, The Flajolet-Martin Algorithm, Combining Estimates, Space Requirements.
10	Counting Ones in a Window The Cost of Exact Counts, The Datar-Gionis-Indyk-Motwani Algorithm, Query Answering in the DGIM Algorithm, Decaying Windows
	Link Analysis PageRank Definition, Structure of the web, dead ends, Using Page rank in a search engine, Efficient computation of Page Rank:- PageRank Iteration Using MapReduce, Use of Combiners to Consolidate the Result Vector
11	Frequent Item sets Handling Larger Datasets in Main Memory Algorithm of Park, Chen, and Yu, The Multistage Algorithm, The Multihash Algorithm. The Son Algorithm and MapReduce Counting Frequent Items in a Stream Sampling Methods for Streams, Frequent Item sets in Decaying Windows
12	Clustering CURE Algorithm, Stream-Computing, A Stream-Clustering Algorithm, Initializing & Merging Buckets, Answering Queries.
13	Recommendation Systems A Model for Recommendation Systems, Content-Based Recommendations, Collaborative Filtering.
14	Mining Social-Network Graphs Social Networks as Graphs, Clustering of Social-Network Graphs, Direct Discovery of Communities, SimRank, Counting triangles using MapReduce
15	Review
16	Final Term Exam

Basic Subjects

Subject: Fundamentals of Programming 1 – CS101

Class & Semester: Year 1, 1st Semester			
Credits: 4 Credits **Category:** Basic **Lab hours :** 6 hour-session in a week 270 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments/ Homework/Class Attendance/Group Project		20
3	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	C++ PROGRAMMING Program design including data structures	D.S. Malik	Sixth edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	C++ How to program	Deitel & Deitel,	
2	Let Us C++	yashavant kanetkar	

Course Description:

The primary goal is to motivate and excite all Computer Science students, regardless of their level. Motivation and excitement are critical factors that lead to the success of the programming student. Algorithms and problem-solving: Problem-solving strategies; the role of algorithms in the problem-solving process; implementation strategies for algorithms; debugging strategies; the concept and properties of algorithms - Fundamental programming constructs: Syntax and semantics of a higher-level language; variables, types, expressions, and assignment; simple I/O; conditional and iterative control structures; functions and parameter passing; structured decomposition.

Course Objectives:

By the end of this course, students should be able to:

- Confidently design algorithms to solve simple problems,
- Solve basic programming problems using a variety of skills and strategies.
- Use pseudo-code and visual modeling to prepare clear and accurate program documentation and models.
- Be able to implement those algorithms in the Processing programming environment, be able to correct, test and debug Processing programs, and be able to explain how algorithms and processing programs work.
- Examine working programs to identify their structures

Homework and class activity details

Throughout the semester the students are expected to learn and practice algorithms, flowcharts and basic programming language. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	**Introduction** What Is a Computer? Computer Programs Task/Problem Solving
2	**Task Solving and Algorithm:**
	Definition of Algorithm
3	Algorithm Executor
	Algorithm Commands
	Ways of writing the algorithm.
4	The functional scheme of the structure of the computer and the scheme and the command cycle of the processor as executives for the algorithm.
	The meta-language of writing the algorithm. Types of translators
5	**Flowcharts:** Flowchart concept
	Flowchart Symbols Elements of the flowchart. Pseudo-code
6	**Programming languages classifications**
	Basic programming constructs. Programming paradigms.
	The criteria for the classification of programming languages Types of Translator History of C++
7	Processing a C++ Program

	Execution Cycle
	Stages of the program formation
8	Mid Term Exam
9	**Basic program in C++** Coding, testing, and debugging
	Special Symbols, Reserved Words and Identifiers Data Types
	Simple Data Type
10	Rules of Operator Precedence Algebra and C++ Comparisons
	C++ Examples Variable Initialization Difference between pre- and post- More on Assignment Statements
11	**Control Structures:** If Statement If and if-else Statement
	If-else if Statement
12	**The switch Statement**
	Using Loop Statements For Statement
13	The While Statement
	The Do... While Statement
14	break Statement The continue Statement
	The Go to statement
15	Review
	Exam preparation
16	Final Term Exam

Subject: Computer Skills – CS102

Class & Semester: Year 1, 1st Semester			
Credits: 2 Credits **Category:** Basic **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments/ Homework/Class Attendance/Group Project		20
3	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Microsoft Word 2016 Introduction Quick Reference Guide**	B. Beezix	Beezix Inc. - Publishers
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Microsoft Office 2010**	Gary B. Shelly	Cengage Learning; 1 edition (August 5, 2010)
2	**Microsoft Word 2013: Complete**	Misty E. Vermaat	Course Technology; 1 edition (August 22, 2013)
3	**Microsoft PowerPoint 2013: Complete**	Misty E. Vermaat	Course Technology; 1 edition (August 22, 2013)

Course Description:

The basic concept of this course is to enable the students to work in Microsoft Office. Although the whole MS-OFFICS is impossible to finish in this course but the main concept is to just work in 3 main office programs, namely, Word, PowerPoint and Excel. The main objective is to enable students to do their assignments, homeworks, presentations, etc in MS-OFFICS.

Course Objectives:

The students are expected to learn the following objectives.

- Create and Save documents in MS-Word
- Learn different formatting features of MS word
- Learn how to insert different entities in MS word document, namely, images, tables, charts, header and footers, autoshapes, screen shots, etc.
- Learn how to change page layout in word documents
- Learn how to insert references, indexes, citations, etc.
- Learn how to protect word documents.
- Learn how to make presentations in MS-Powerpoint
- Learn how to apply different designing features
- Learn how to develop slide transitions and animations, etc.
- Learn how to work with spreadsheets
- Learn how the functions work in MS-Excel and know to work with pivot tables.

Homework and class activity details

Throughout the semester the students are expected to work in MS office programs. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	**Section-1: MS-Word**
	Creating, opening, saving the documents
	Formatting text and images
2	Creating tables and formatting them
	Inserting images, screenshots, shapes, text boxes, header and footer, sections, etc
3	Table of contents, watermarks, footnotes, etc
	Printing the documents
4	Protecting the documents by applying tack changes and passwords
	inserting hyperlinks, book marks, captions and cross references
5	Inserting references, indexes, Bibliography and table of contents
	Views of documents and macros
6	**Section-3: PowerPoint**
	Creating Slides and Presentations
	Designing and Formatting
7	Slide Transitions
	Animations
	Slide Show
8	Mid Term Exam
9	**Section-1: MS-Excel**

	Creating, opening, saving the spreadsheets
	Formatting text and images and perform conditional formatting
10	Work with charts and spark lines
	Work with filters, sorts and data tools
11	Page layout ribbon in excel sheet
	working with external data and connections
12	Work with data tools and outlines
	Work with excel functions and formulas
13	Work with excel functions -2
	Work with excel functions -3
14	Work with excel functions -4
	Formula Auditing
15	Calculations and defined names
	Pivot Tables
16	Final Term Exam

Subject: Computer Fundamentals – CS103

Class & Semester: First Year, 1st Semester			
Credits: 4 Credits **Category:** Basic **Lecture hours:** 4 lecture-hours every week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homeworks/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
	Discovering Computers	Vermaat M. E. et al	Cengage Learning
1	Principles of Computer Science,	Carl Reynolds and Paul Tymann	Schaum's Outline Series, McGraw Hill, New Delhi, 2008.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Basic Computer Engineering	Sanjay Silakari and Rajesh K. Shukla	Wiley- India, 2011
2	Fundamental Concepts of Computer System	Asiya Sultan Ali, Amena Nudrat	
3	Using Information Technology	Sawyer William	Second Edition

Course Description:

In this course, students will become familiar with the basic principles of a personal computer, including the internal hardware, the operating system, and software applications. The focus of the course is on the fundamentals, learning and using the applications, and understanding the basic roles and responsibilities of the software, hardware, and operating system.

Course Objectives:

To provide a fundamental knowledge of Computer Science, which includes evolution of computers and its various components and applications. This subject also gives a complete overview of fields

where computer science is used.

Learning Outcomes:

Upon successful completion of this module students will be able to understand about the structure of computer, the operations of computer systems and its components.

Detailed Course Outline:

Week No.	Topics
1	Introduction and Evolution of Computing
2	Computer Systems and its Components Network and the Internet Computer software Categories of computers Example of computer usage
3	Computer Hardware and Software
4	Operating Systems
5	The components of the System Unit The system unit
6	Processor Data representation Memory Expansion slots and adapter cards
7	Ports and connectors Buses Bays Power supply
8	Mid Term Examination
9	What is input? What are input devices? Keyboard Mouse Touch screens
10	Pen input Voice input Video input Other input devices
11	Output What is output? Display devices
12	Printers Speakers Other output devices
13	Storage

	Hard disks Flash memory storage Cloud storage Optical discs Other types of storage
14	Numbers Systems Decimal system Binary system
15	Octal system Hexadecimal system Number conversion
16	Final Term Exam

Subject: Introduction to Programming 2 - CS201

Class & Semester: Year 1, 2nd Semester			
Credits: 3 Credits **Pre-requisites: IS103** **Lecture hours :** 2 Joint-hours every week 90 minutes **LAB hours :** 2 Joint-hours every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	LAB Work		10
2	Mid-term exam		20
3	Assignments		10
5	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	C++ programming: Program design including data structures	Malik, D. S	Nelson Education.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	C++ How to program	Deitel & Deitel,	
2	Let Us C++	yashavant kanetkar	

Course Description:

The aim of this course is to provide advance of programming language using C++, which is important for application development. After completing this course the students will be able to make medium programs.

Couse Objectives:

This course would help the students to develop programming language skills using C++.

Learning Outcomes:

By the end of this module the students should be able to know what is involved in creating a fully functional structured program. This subject is just a continuation of Programming-1, and will cover

the remaining topics of structured programming.
Students are expected to achieve the following:

- Design, compile and execute C++ programs to solve basic problems.
- Describe the concept of a variable.
- Describe and use C++ control structures.
- Describe and use functions, parameters, and return values.
- Perform file input and output.
- Solve problems requiring the use of arrays.
- Use pointers to process arrays, pass arguments, and improve program efficiency.

Detailed Course Outline:

Week No.	Contents
1	Introduction to Course
2	Functions
3	Arrays
4	Overview of Arrays and Functions(2)
5	Multidimensional arrays
6	Date types and type conversion
7	Debugging
8	**Mid Term Exam**
9	Pointer (1)
10	Pointer (2)
11	Dynamic Variables
12	Dynamic Arrays
13	Functions and Pointers
14	Recursion
15	**Course Review**
16	**Final Exam**

Subject: Calculus 1 – EL102

Class & Semester: 1st year , 1nd Semester			
Credits: 3 Credits **Hours:** 3 Joint-hours every week 135 minutesmailto:zubair.kpu@gmail.com			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Quiz		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Calculus with Analytic Geometry	Howard Anton	John Wiley & Sons Inc. 5th edition
Recommended Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Calculus	THOMAS/FINNEY	ADDISON-WESLEY 11th edition

Course Description:

Single variable General mathematics, which is what we begin with, can deal with motion of an object along a fixed path. The more general problem, when motion can take place on a surface, or in space, can be handled by multivariable General mathematics. So single variable calculus is the key to the general problem as well as real numbers, set theory, intervals and inequalities, Lines, functions and graphs, Limits and Continuity, Differentiation, Integration and Sequence and Series.

Couse Objectives:

The purpose of the course is to study the single variable General mathematics which deal motion of the objects.

Learning Outcomes:

At the end of the course, you should be able to:

- Use a variety of methods in solving real-life, practical, technical, and theoretical problems.
- Select and use an appropriate problem-solving strategy.
- Explain the limit process and that calculus centers around this concept.
- Identify the two classical problems that were solved by the discovery of calculus, the tangent problem and the area problem.
- Describe the two main branches of calculus, Differential calculus and Integral calculus.

Detailed Course Outline:

Week No.	Topics
1	Function, kind of Function, Algebraic Function
2	Domain, Co- Domain of Function, Example and Practices
3	Limit, Defecation of Limit, Right and Lift Limit
4	Role of Limit, First famous Limit,
5	Continuity, Discontinuity, kind of Discontinuity
6	The Derivative, Phasics role of Derivative
7	Base role of Derivatives, Formula of Derivatives of sepal Functions,
8	**Mid Term Exam**
9	Derivatives of Trigonometric Functions, Loh-Pital Role
10	Taylor and Makloren Formula
11	Using of Derivative, (Extremome of function)
12	Search of graph of Function
13	Series, Conditional of series, مشخصه های تقارب سلسله ها
14	Cauchy's test, D'Alembrt test, Cauchy's integral test
15	Leibniz test, properties of different of values series, Functionality series
16	**Final Exam**

Subject: Discrete Mathematics – CS202

Class & Semester: 1st year , 2nd Semester			
Credits: 3 Credits **Pre-requisites:** **Hours:** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	NA	
2	Mid-term exam	20	
3	Assignments	10	
4	LABs	10	
5	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Discrete Mathematics and its Applications	K. H. Rosen	*5th Edition, McGraw-Hill, 2002*
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	*Discrete Mathematical Structures with Applications to Computer Science*	Tremblay J.P, and Manohar R	*McGraw Hill Book Company, 1975, International Edition, 1987*
2	Discrete and Combinatorial mathematics	Ralph P., Grimaldi	*Addison-Wesley Publishing Company*

Course Description:

The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. In particular, this class is meant to introduce logic, proofs, sets, relations, functions, counting, and probability, with an emphasis on applications in computer science.

Couse Objectives:

By using Logic, Recursion, Sets, Counting and Probability a major purpose of the course is to present material in a precise and readable manner with the concepts and techniques of discrete objects—Objects consisting of distinct of unconnected elements. Thought this course the student will develop mathematical maturity; it will develop their ability to understand and create mathematical arguments. Students will learn particular set of mathematical facts and how to apply them To- achieve goals five important themes are interwoven in the course i.e. mathematical reasoning combinatorial analysis discrete structure algorithmic thinking and application/modeling.

Learning Outcomes:

After the completion of the course, the student will be able to understand:

- Familiarity with constructing proofs.
- Familiarity with elementary formal logic.
- Familiarity with set algebra.
- Familiarity with combinatorial analysis.
- Familiarity with recurrence relations.
- Familiarity with graphs and trees, relations and functions
-

Detailed Course Outline:

Week No.	Topics
1	Sets, Empty set, Equal sets, Proper set, Improper sets,
2	Power sets, Venn Diagram, Union and Intersection sets
3	Relation. Binary relation, Doman and Range
4	Invers relation, Direct and matrix Relation
5	Reflexive, symmetric, composition, Transitive Relation
6	Function, Doman, Co-domain, Injective and onto function
7	Identity, constant, Invers function, Composition Function
8	Mid Term Exam
9	Logical operation, Conjunction, Disconnection,
10	Tautology and lows, Logically Equivalence
11	Graph theory, Degree of Vertex, simple and multi graph
12	Regular, Isomorphic Graph, Euler graph
13	Trees Graph, properties of trees, spanning trees
14	Permutation, repetition permutation, Combination
15	Boolean algebra, definition, properties, DE Morgan's laws

Subject: Calculus – EL202

Class & Semester: 1st year , 2nd Semester			
Credits: 3 Credits **Hours:** 3 Joint-hours every week 135 minutesmailto:zubair.kpu@gmail.com			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Quiz		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Calculus with Analytic Geometry	Howard Anton	John Wiley & Sons Inc. 5th edition
Recommended Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Calculus	THOMAS/FINNEY	ADDISON-WESLEY 11th edition

Course Description:

Single variable calculus, which is what we begin with, can deal with motion of an object along a fixed path. The more general problem, when motion can take place on a surface, or in space, can be handled by multivariable calculus. So single variable calculus is the key to the general problem as well real numbers, set theory, intervals and inequalities, Lines, functions and graphs, Limits and Continuity, Differentiation, Integration and Sequence and Series.

Couse Objectives:

The purpose of the course is to study the single variable calculus which deal motion of the objects.

Learning Outcomes:

At the end of the course, you should be able to:

- Use a variety of methods in solving real-life, practical, technical, and theoretical problems.
- Select and use an appropriate problem-solving strategy.
- Explain the limit process and that calculus centers around this concept.
- Identify the two classical problems that were solved by the discovery of calculus, The tangent problem and the area problem.
- Describe the two main branches of calculus, Differential calculus and Integral calculus.

Detailed Course Outline:

Week No.	Topics
1	Integral, Integral of first value Function
2	Properties of infinite Integral
3	Table of Formula, Kind of Integration of Countering
4	Solve of Questions, Use Simple Formula
5	Change of Value on Integral
6	Theorem of Chebeshow
7	انتیگرال گیری توابع کسری
8	**Mid Term Exam**
9	definite Integral and their applications
10	Newton-Leibniz Formula, Specific and no Specific Integral
11	Using of definite Integral, Area,
12	Counting of volume
13	Function of to variable توابع دو متحوله
14	Limits and Derivative
15	Extrimum (Max,Min)
16	**F inal Exam**

Subject: General English 2 – EL102

Class& Semester: 1st year , 2st Semester			
Credits: 2 Credits **Pre-requisites: EL101** **Hours:** 2 Joint-hours every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Class activities and homework		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Interchange 2	Thompson, A.J. ; Martinet, A.V.	Oxford University Press
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Practical English Usage	Jack C. Richards (2013)	Cambridge University Press

Course Description:

This course aims at enhancing students' knowledge of English Language up to intermediate level. It enhance students' knowledge of grammatical structures, sentences structure and giving them new insight into words, practical writing skills as a means of communication by focusing on the grammatical basics of the language. The difficulty level of the course increases gradually and enables the students to transfer their thoughts on paper so they may become persuasive, clear, and concise in their writings.

Couse Objectives:

The objective of the course is to enhance students' knowledge about English language.

Learning Outcomes:

At the end of the course, students be able to:

- State and apply the seven principles of clear writing.
- To communicate in English in the class
- To use present tenses in their speaking
- To describe events like holidays, festival...
- To write short descriptive paragraph
- To write a short report
- Identify and explain basic clause patterns.
- Understand and apply common English language writing styles
- Review the written documents for any grammatical problems

Detailed Course Outline:

Week No.	Topics
1	Course Introduction
2	Food and Health
3	History Detective
4	Tradition and Rituals
5	Urban Underworld
6	Who we Are?
7	Global Warning
8	**Mid Term Exam**
9	Incredible insect
10	Great Explore
11	Our Bond with Animals
12	Greeting in other context
13	Talking about the weather
14	Telephone Conversation
15	Formal Conversation
16	**Final Exam**

Subject: Network Fundamentals – CS302

Class & Semester	**2nd** year, 3rd semester		
Credits: 3 credits Pre-requisites: CS206 Lecture hours: 2 Lectures and 2 Practical			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Evaluation		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Networking: A top down Approach,	Kurose and Ross	Pearson, sixth edition, 2013
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Networks,	Andrew S. Tanenbaum	Pearson, Fifth Edition, 2011
2	Data Communication,	William Stallings	Pearson, Eight Edition, 2007

Course Description:

This course is designed to focus on computer networks specifically in Link, Network, Transport and Application layers. The concept of MAC and IP addressing is discussed in this course. Routing protocols such as RIP, OSPF, EIGRP and IS-IS are also covered in this course with practical exercises. Transport protocols (TCP and UDP) along with congestion control algorithms are also discussed. Finally this course will discuss some prominent application protocols such as HTTP, DNS, and SMTP. Before taking this course, student must have successfully passed the Data Communication course.

Course Objectives:

The main idea behind designing this course is to familiarize computer network students about the structures of a packet switched computer network. They need to understand and work with static and dynamic routing in the packet switched networks, to have the knowledge how the famous application protocols work and to know what sockets are in distributed applications.

Learning Outcomes:

After completion of this course, student can configure different routing protocols, working with IP networks. Students will also be able to join the Computer Networks in the next semester.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Fundamentals of computer networks:
3	Network Addressing
4	Switching in packet switched networks
5	Routing in packet switched networks (RIP, OSPF, EIGRP, IS-IS)
6	Routing in packet switched networks (RIP, OSPF, EIGRP, IS-IS)
7	Routing in packet switched networks (RIP, OSPF, EIGRP, IS-IS)
8	Midterm Exam
9	Transport layer protocols (TCP, UDP, congestion controls, etc)
10	Transport layer protocols (TCP, UDP, congestion controls, etc)
11	Application Layer Protocols (Principles of HTTP, FTP, SMTP and DNS)
12	Application Layer Protocols (Principles of HTTP, FTP, SMTP and DNS)
13	Routing in between autonomous systems: ISPs and the Internet Architectures
14	Routing in between autonomous systems: ISPs and the Internet Architectures
15	Concept of socket programming with TCP and UDP
16	Final Exam

Subject: Technical English – EL301

Class& Semester: 2st year , 3rd Semester			
Credits: 2 Credits **Pre-requisites: EL201** **Hours:** 2 Joint-hours every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Class Activities and Homework		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	English for Information Technology	Vahid Reza Mirzaeian	2014 Tehran
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Skill Worker	Mir,S.S.; Mansoor,S; Irfan,H	

Course Description:

The course integrates the skills of reading, writing, vocabulary building and grammar usage and also includes discrete lessons on these topics. The reading and writing lessons incorporate vocabulary building along with description, narration, exposition and argument. Each lesson contains reading passages followed by several exercises to comprehend the passage while utilizing all the above mentioned techniques. The initial passages are based on factual texts on computers and their characteristics with the focus on organization of information and description. The imaginative texts show how writers utilize various descriptions to convey different meanings. Thus the course aims at improving students' skills required for learning English as a second language.

Course Objectives:

At the end of the course students will be able:

- Apply reading strategies including extracting main ideas, reading for details.
- Read the authentic text comprehensively.
- Read stories with difficult topics.
- To define and identify grammatical terms and their usage.
- To use terminology related to their field.
- To identify and predict unknown words using a variety of strategies including reading, context clues, and knowledge of word structures, letter-sound relationships and inferences.
- To use /apply the skills and strategies of the reading process to comprehend, interpret, and evaluate what they have read.
- To recognize the usage of reading to develop fluency and understanding of appropriate material.
- To produce an analytical approach to recognize grammatical errors in sentences.
- To evaluate and assess different texts and make inferences.

Detailed Course Outline:

Week No.	Topics
1	Course Introduction
2	Information Technology
3	Data Compression
4	Data processing
5	Storage Hardware
6	Computer Memory
7	Cache Memory
8	**Mid Term Exam**
9	Internet Access
10	Bandwidth
11	Local Area Network
12	Parts of Communication System
13	Use of the Internet
14	Electronic Mail and News group
15	Students Presentation
16	**Final Exam**

Subject: Probability and Statistics – EL302

Class & Semester: 2nd year , 3rd Semester			
Credits: 3 Credits **Hours:** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Quiz		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Introduction to Statistical Theory (Part I and II)	Prof.Sher Mouhammad Chaudhry and Dr.Shahid Kamal	2nd
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Statistics Theory and Methods	Afzal Beg and Miraj Din Mirza	1st
2	Polymer basic Statistics	Mohammad Rauf Chaudhry	1st Polymer Publication

Course Description:

Starting with the basic concepts of data and its types, this course introduces the various methods and procedures of collecting, organizing, summarizing, presenting and analyzing the data. The regression and correlation analysis is used to evaluate the relationship between two or more variables. The second portion of the course focuses on the probability theory. From the basic probability rules to the construction of all the well-known probability distributions like binomial, hypergeometric, uniform and normal distributions are discussed in this part. The course will finally introduce the inferential statistics which is further divided into estimation and hypothesis testing. It deals with the drawing of conclusions about various phenomena on the basis of real data collected on sample basis. The use of appropriate methods like Z-test, T-test, F-test, Chi-square test and ANOVA are explained with

examples.

Learning Outcomes:

At the end of the course, you should be able to understand:

- Different meanings of statistics and data types
- A variety of methods for collecting, presenting and summarizing data
- Methodologies for regression and correlation analysis for future perditions
- Basic concepts and rules of probability along with important probability distributions
- Sampling concept, its types and techniques
- Estimating and hypothesis testing using main distributions
- Usage of Analysis-of-variance and experimental design
- Fundamental level of skills for basic statistical computing using Calculator / Excel / Math type etc.
- How to communicate to others the importance and relevance of statistics in the modern world
- How to be an independent learner, able to acquire further knowledge with little guidance or support.

Detailed Course Outline:

Week No.	Contents
1	**Statistics** Introduction to Statistics, Descriptive Statistics, Inferential Statistics
2	**Presentation of Data** Classification and Presentation of Data (frequency distribution tables and diagrams), Bar diagram, line diagram and circle diagram. Histogram, polygon.
3	Properties of frequency distribution diagrams. Analyse of data(central tendency, dispersion,…).
4	**Measure of Central Tendency** Average & Measure, Types of Averages, Summation Notation Arithmetic Mean, Weighted Mean, Geometric Mean, Harmonic mean.
5	Median, Mode, Mean deviation Properties of central tendency.
6	Variance & standard deviation , Coefficient variation.
7	Multi variable population., Introduction to Probability, Counting techniques Addition rule, Multiplication rule Arrangements , Permutation , Combination
8	**Mid Term Exams**
9	Compound arrangement, Compound permutation & combination Meaning and Sources of Probability, Random experiment
10	**Combinatory and Probability** Combinatory, Sampling without replacement
11	Basic Terminologies of Probability, Event, Numerical question of the book.
12	Mutually Exclusive Events, Probability spaces and Sample apace and events

13	Conditional probability, Multiplication and total probability rules
14	Bayes Theorem, Random variable, discrete and continues variables. Probability density function, Probability distributions, continues type and discrete type distribution function.
15	The Bernoulli and binomial distributions**,** Bernoulli formula, Power series The Poisson distribution, The hyper geometric distribution
16	**Final Exam**

Subject: Academic Writing – EL401

Class& Semester: 2nd year , 4th Semester			
Credits: 2 Credits **Pre-requisites: EL301** **Hours:** 2 Joint-hours every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Class Activities and Homework	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Great Writing	Keith S. Folse, Elena Vestri Solomon and David Clabeaux	Sherrise Roehr 2015
Recommended Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Writing to communicate	Cynthia A. Boardman	International learning center (2009).

Course Description:

The writing lessons in this course incorporate vocabulary building along with description, narration, exposition and argument. Each lesson contains reading passages followed by several exercises to comprehend the passage while utilizing all the above mentioned techniques. The initial passages are based on factual texts on computers and their characteristics with the focus on organization of information and description. The imaginative texts show how writers utilize various descriptions to convey different meanings. Thus the course aims at improving students' skills required for learning English as a second language.

Learning Outcomes:

At the end of this course, students will be able:

- to understand parts of paragraph
- to understand purpose, audience, clarity, unity and coherence in writing a paragraph
- to understand descriptive, comparison, Cause-effect and classification paragraph
- to understand similarities between paragraph and essay
- to write cause and effect essay
- to use punctuation correctly
- understand the writer style and evaluating the text.
- to use transition words
- to paraphrase authors idea
- to site Authors idea
- to write reference

Detailed Course Outline:

Week No.	Topics
1	Introduction
2	Introduction to Paragraph
3	Five Elements of Good writing
4	Type of Paragraph
5	Signal Words
6	Punctuations
7	Moving From Paragraph to Essay
8	**Mid Term Exam**
9	In- text citation
10	End Text- citation
11	Paraphrase
12	Descriptive Essay
13	Comparison Essay
14	Cause and Effect Essay
15	Classification Essay
16	**Final Exam**

Subject: Computer Networks, Course Code: CS402

Class & Semester: 3rd Class, 5th Semester			
Credits: 3 Credits **Type:** Basics **Prerequisite:** CS309 **Lecture hours:** 2 Joint-hours every week 90 minutes **Lab hours :** 2 Joint-session every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	NA	
2	Mid-term exam	20	
3	Assignments	10	
4	LABs	10	
5	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Networking: A Top Down Approach	Jim Kurose	6th Edition
2	Data Communication & Networking	Behroz Frouzan	5th Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Networks	Andrew S. Tanenbaum & David J. Wetherall	Pearson, Fifth Edition
2	Data & Computer Communication	William Stallings	Pearson, Eighth Edition

Course Description:

Computer Networks course is the supplementary/complementary course of fundamentals of data communication. The course covers broad topics of routing algorithms/protocols, reporting and delivery in data networks. In addition, addressing, IPv6, transport layer protocols, and application layer protocols are the other main topics covered in this course. To ensure that students can use the

theory in practical environment, sufficient numbers of assignments and LAB are planned. Fundamentals of data communication is the pre-requisite for this course and any student with basic knowledge of computer science can attend and follow the course. Brief outline of the course is explained below which will be covered during semester, but the course is not limited to this outline, in case needed the outline can be further extended or squeezed.

Couse Objectives:

The objective of the course is to familiarize and provide deep understanding to students about computer network architecture, routing and switching protocols, network infrastructure and design.

Learning Outcomes:

By successful completion of the course, the students will be able to design LAN & WAN network, do the configuration of router and switches for small to medium size companies. The Computer Networks course provides sufficient theory and practical lab knowledge and skills so that students can implement efficient routing and switching for small to medium organization.

Detailed Course Outline:

Week No.	Topics
1	Lecture1: Introduction to Course
2	Lecture2: Review of OSI & TCP/IP Model
3	Lecture3: Network layer; data plane and control plane
4	Lecture4: Network layer; Addressing
5	Lecture5: Routing Algorithms
6	Lecture6: RIP, IGRP & EIGRP
7	Lecture7: OSPF
8	Lecture8: Multi-area OSPF
9	**Mid Term Exam**
10	Lecture9: Transport Layer Protocols

11	Lecture10 : TCP, UDP, SCTP
12	Lecture11: Application Layer Protocols
13	Lecture12: DHCP, DNS
14	Lecture13: SMTP, POP3, SNMP
15	**Course Review**
16	**Final Exam**

Subject: Diploma Project Guide - CS723

Class & Semester	Fourth year, 7th Semester		
Credits: 1 credits Pre-requisites: NON Lecture hours: 1 contact hour per week			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Timely project or research topic determination and presentation		10
2	Attendance and commitments		30
3	Understanding guidelines and document formatting		20
4	Readiness for conducting the project real work		40
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	KPU's thesis format plus presentations		
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Hands-on books when required	NA	NA

Course Description:

Diploma Project Guidance (DDG) is the prep-prep course for bachelor thesis in semester eight. It is a 1 credit course with one contact hour class.

Objectives:

The objective for this course is that students have to be guided to know how to select there thesis title, supervisor and give a justification for their topics. A general guidance to academic writing and conducting projects or research also provided to students.

Learning Outcomes:

- All and each student should choose his or her final project topic
- All and each student should choose his or her supervisor
- All and each student should have a solid justification for his or her chosen topic
- All and each student should know the format and writing requirements of his or her final documentation and project implementation.

Detailed Course Outline:

Week No.	Topics
1	Introduction to the course, and project topic selection starts
2	Brainstorming for listing suitable topics that might be appropriate for a project
3	Guidelines and discussion about how to select a good topic
4	Introduction to requirements and timing

5	Formatting of documents and structure
6	Comparison of project based topics and research based topics
7	Discussing about students suggested topics and supervisor selection
8	Students should justify their topics (justification will be marked)
9	Guideline to academic document writing
10	Discussing a scientific paper structure and writing requirements (with example)
11	Discussing and questions how students understood the writing points on discussed paper
12	Discussion on project initial document and preparation
13	Presentation of final topic by students
14	Presentation of final topic by students
15	Presentation of final topic by students
16	Final Exam

Core Subjects

Subject: Fundamental of Information Systems (FIS) – CS205

Class & Semester: Year 1, 2nd Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Essentials of Management Information Systems**	Kenneth C. Laudon, Jane Price Laudon	Prentice Hall
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Introduction to Information Systems**	James A. O'Brien and George M. Marakas	Paul Ducham

Course Description:

Information systems are an integral part of all business activities and careers. This course is designed to introduce students to contemporary information systems and demonstrate how these systems are used throughout global organizations. The focus of this course will be on the key components of information systems, people, software, hardware, data, and communication technologies and how these components can be integrated and managed to create competitive advantage. Through the knowledge of how IS provides a competitive advantage students will gain an understanding of how information is used in organizations and how IT enables improvement in quality, speed, and agility. This course also provides an introduction to systems and development concepts, technology acquisition, and various types of application software that have become prevalent or are emerging in modern organizations and society.

Course Objectives:

The students are expected to learn the following objectives.

- Foundation of Information Systems in Business
- Competing with Information Technology

- Computer Hardware
- Computer Software
- Data Resource Management
- Telecommunications and Networks
- Enterprise Business Systems and Functional Business Systems
- Securing Information Systems

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	Introduction to FIS
2	Information Systems
3	Perspectives on Information Systems and Information Technology
4	e-business: Use of information Systems
5	Types of Business Information Systems
6	The Information Systems Function in Business
7	IT Infrastructure
8	Mid Term Exam
9	Computer Software's
10	Foundations of business Intelligence
11	Database Approach to Data Management
12	Improving Business Performance and Decision Making

13	Telecommunications, the Internet, and Wireless Technology
14	The Global Internet and web
15	Course Review
16	Final Term Exam

Subject: Object oriented programming – CS301

Class & Semester: 2nd year , 3rd Semester			
Credits: 3 Credits **Category:** Core **Pre-requisites: CS201** **Lecture hours :** 2 Joint-hours every week 90 minutes **LAB hours :** 2 Joint-hours every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	LAB Work		10
2	Mid-term exam		20
3	Assignments		10
5	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Fundamentals of Java,	Kenneth Lambert and Martin Osborne	Third Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Head First Java	Kathy Sierra (and Bert Bates	2nd Edition

Course Description:

To teach attendees the fundamentals of Java programming syntax and how to use Java to write object oriented. By the end of this module the students should be able to know what is involved in creating a fully functional Object Oriented program. The main purpose of this course is to introduce all the object oriented concepts and also learn java programing.

Couse Objectives:

This course is designed to teach Object-Oriented programming concepts, techniques, and applications using the Java programming language.

Learning Outcomes:

To learn Object-Oriented programming concepts and techniques using the Java programming language. To learn to write, test, and debug introductory level Object-Oriented programs using Java

Detailed Course Outline:

Week No.	Topics
1	Getting Started with Java
2	Introduction to Objects Oriented programming
3	Dealing with Classes and Objects: Class and Object, Instance Data and Class Data ,Methods
4	Dealing with Classes and Objects: Method overloading, Constructors, Access Modifiers, Encapsulation, Objects and function argument, Returning objects from functions
5	Inheritance in Java, Casting, Method Overriding, Constructor Overloading
6	Polymorphism :Super, The Object Class, Overriding member functions
7	Pointers and Functions, Pointers and Strings
8	**Mid Term Exam**
9	Virtual Functions and Abstract classes
10	Friend functions and class ,Static functions
11	Inheritance in Java :Inheritance, Inheritance in Java, Casting
12	Inheritance in Java : Method Overriding ,Constructor Overloading ,Polymorphism, Super ,The Object Class
13	Exception Handling
14	Discussion of Some Object Oriented Concepts in C++ which are not in Java
15	**Course Review**
16	**Final Exam**

Subject: System Analysis and Design (SAD) - CS305

Class & Semester: Year 2, 3rd Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			

Course Description:

This course explores the design, selection, implementation and management of enterprise IT solutions. The focus is on applications and infrastructure and their fit with the business. Students learn frameworks and strategies for infrastructure management, system administration, data/information architecture, content management, distributed computing, middleware, legacy system integration, system consolidation, and software selection, total cost of ownership calculation, IT investment analysis, and emerging technologies. These topics are addressed both within and beyond the organization, with attention paid to managing risk and security within audit and compliance standards.

Students also hone their ability to communicate technology architecture strategies concisely to a general business audience.

Course Objectives:

The students are expected to learn the following objectives.

- Understand a variety of frameworks for enterprise architecture analysis and decision making.

- Evaluate the total cost of ownership and return on investment for architecture alternatives.
- Utilize techniques for assessing and managing risk across the portfolio of the enterprise.
- Evaluate and plan for the integration of emerging technologies.
- Administer systems, including the use of virtualization and monitoring, power and cooling issues.
- Manage proliferating types and volume of content.
- Understand the core concepts of data/information architecture and evaluate existing data/information architecture designs.
- Plan for business continuity.
- Understand the benefits and risks of service oriented architecture.
- Understand the role of audit and compliance in enterprise architecture.
- Understand the integration of enterprise systems with interorganizational partners such as suppliers, government, etc.

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	**Service oriented architecture**
2	Enterprise architecture frameworks
3	Systems integration
4	Enterprise resource software
5	Monitoring and metrics for infrastructure and business processes
6	Green computing
7	Virtualization of storage and systems
8	Mid Term Exam
9	The role of open source software

10	Risk management
11	Business continuity
12	Total cost of ownership and return on investment
13	Software as a service
14	Content management
15	System administration
16	Final Term Exam

Subject: Fundamentals of Web Design – CS212

Class & Semester: Year 2, 3rd Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics.	Robbins, J. N	O'Reilly Media, Inc.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	HTML & CSS Design and Build Websites	Jon Duckett	John Wiley & Sons, Inc.

Course Description:

The Web Design course examines the process of creating functional, standards-based content for the Internet. This course will provide a basic and advanced understanding of the Internet, Web Protocols, methods and techniques of developing a simple to moderately complex website. Using the current standard web page language, students will be instructed on creating and maintaining a simple and complex web site for different class of devices.

Course Objectives:

After Completion of this class Students will be able to:

- Make static and responsive web pages.
- Design a professional website.

Homework and class activity details

Throughout the semester, students are expected to attend the lecture hours and further more they are asked to do class activities and assignments. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic.

Detailed Course Outline:

Week	Contents
1	Introduction
	Web Fundamentals
	The Internet and Web
2	Principles of Application and Transport Layer Protocols (HTTP, FTP, SMTP, IMAP,POP3,DNS)
	Structure Process to develop a Web Application
3	HTML5
	Lists & Special Characters
4	Tables
	Forms
5	CSS3
	Css selector
6	Web Fonts, Text Formatting
	Background
	Padding, Margin and Borders
7	*Building Layouts*
	Media Queries
	Review
8	Mid Term Exam
9	JavaScript
	Basic syntax
	HTML DOM
10	Events and Event handlers
	Regular Expressions
11	Functions
	Get and post methods
12	JQuery
13	Basic Syntax
14	Introduction to Frameworks
15	Bootstrap3 ,AngularJS (Optional)
16	Final Term Exam

Subject: Data Structure and Algorithms – CS401

Class & Semester	Second year, fourth semester		
Credits: 3 credits **Pre-requisites:** CS301 Lecture hours: 2 hours lecture and 2 hours practice			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Evaluation		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Information Security Principles and Practice	Mark Stamp San Jose State University	A John Wiley & sons, INC. Publication. 2nd Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Hands-on books when required	NA	NA

Course Description:

Data structure is a core subject in computer science, it covers fundamentals of data organization in computer memory. A particular way of data organization in memory is called data structure. In this course basic ways to push and retrieve data to and from data structures also included.

Objectives:

This course have to be thought in 3 credits with practices based on allocated timing in associated table of fourth semester. Successful teaching of this subject requires to make a fair balance between theory and practice. This course should have assignments and intensive evaluation to help students to understand the course thoroughly.

Learning Outcomes:

By successful completion of this course students should be able to

- Describe different data structures
- Compare and describe different data structures
- Describe the correct usage of different data structures

- Describe the basic algorithms that are suitable with different data structures
- Be able to implement basic data structures by own.
- Be able to understand the given codes

Detailed Course Outline:

Week No.	Topics
1	Introducing Data Structures
2	Arrays, Ordered Arrays, A basic sorting algorithm (e.g. selection sort)
3	Stacks, Queues and Priority Queues
4	Linked Lists
5	Abstract Data Types and Specialized Lists
6	Recursion, Applied Recursion, Merge Sort (applying recursion only)
7	Hash Table, Conflict resolution (probing and open addressing)
8	Mid Term Exam
9	Binary Tree, Binary Tree operations
10	Red-Black Trees, Red-Black Trees insertion, Balance and unbalanced tree
11	Graphs (theory), Formation of graph's structure
12	Searching in graphs DFS, BFS
13	Path in Graph, Special cases with graph
14	Routing in a graph and routing algorithms concept
15	Branch-And-Bound and Dijkstra's Algorithm
16	Final Exam

Subject: Web Development 1 – CS404

Class & Semester: Year 2, 4th Semester

Credits: 3 Credits
Category: Core
Lab hours : 4 hour-session in a week 180 minutes

EVALUATION

S. No	Quizzes and exams	Mark distribution
1	Mid-term exam	20
2	Assignments/ Homework/Class Attendance/Group Project	20
3	Final exam	60

Reference Book

S. No	Book Name	Author(s) Name	Publisher Name & Edition
1	PHP and MySQL for dynamic web sites: visual quickpro guide	Larry. Ullman	Peachpit Press;4th edition (2011)

Recommended Books

S. No	Book Name	Author(s) Name	Publisher Name & Edition

1	PHP Advanced and Object-Oriented Programming: Visual QuickPro Guide	Larry. Ullman	Peachpit Press; 3rd edition (2012)
2	AJAX and PHP. Tworzenie interaktywnych aplikacji internetowych	Bogdan. Brinzarea-Iamandi & Cristian. Darie & Audra. Hendrix	Helion; 2nd edition (2006)
3	Learning Laravel 4 Application Development	Hardik Dangar	Packt Publishing Ltd; 2nd edition (2013)

Course Description:

This course is designed to introduce students with development of dynamic website. This course goes deeply to PHP, an open source scripting language that is most common language for web development. The course starts with basics concepts of PHP and then continues to advanced topic such as storing web state using cookie and session, storing data to database. It also covers how to write program in a structured approach and debug the problems of the code.

Course Objectives:

By successful completion of the course students will learn the following:

- Students will gain basic knowledge of PHP and will be able to develop dynamic websites.
- They will get enough skills to develop website using pure PHP, MySQL, HTML and CSS or use a web framework to develop complex websites.
- They will be able to find the problems of codes.
- They will be able to capture requirements and implement it to codes.
- They will be able to develop a web application

Homework and class activity details

Throughout the semester the students are expected to design a dynamic website. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	Web Server Concepts
2	Server side Scripting Languages

3	CGI Fast CGI J2EE(Introduction)
4	PHP (PHP Hypertext preprocessor)
	Creating PHP Pages
5	Passing Variables
	Conditions and Loops
6	Using PHP with MySQL
	Editing the database
7	Manipulating and Creating Images with PHP
	Validating User Input
8	Mid Term Exam
9	Cookie and Session
10	PHP pages Localization
11	Pagination
12	Access level and privileges
13	Events and Event handlers
14	AJAX
15	MVC Model and Introduction to Frameworks
16	Final Term Exam

Subject: Fundamentals of Database – CS407

Class & Semester: Year 2, 4th Semester			
Credits: 3 Credits **Category:** core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**An Introduction to Database Systems**	Christopher J. Date	Pearson Education;8th edition (2006)
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Database System: The complete book**	Hector. Garcia - Molina	Pearson Education; 2nd edition (June 9, 2008)
2	**Fundamentals of Database Systems**	Ramez. Elmasri	Pearson Education; edition (2008)
3	**Database systems: a practical approach to design, implementation, and management**	Connolly, Thomas M., & Carolyn E. Begg	Pearson Education; 6th edition (2015)

Course Description:
This module explores the relational model and the MySQL. It covers the practicalities of designing, building, populating, accessing, maintaining and tuning a relational database using MySQL. It also explores the architecture of multi-tier database systems and database interfaces.

Course Objectives:
On successful completion of this module, students will be able to

- Design and build a relational database system
- Monitor, tune and administer a relational database system

- Access and manipulate data using MySQL
- Develop stored procedures and triggers
- Make use of DBMS facilities to ensure the integrity and security of a database
- Exploit a range of management tools and interfaces provided by relational database systems

Homework and class activity details

Throughout the semester the students are expected to design a relational database system. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	The Evolution of Database Systems
2	Databases and Database Users
3	History of Database Applications
4	Data Models, Schemas, and Instances
	Three-Schema Architecture and Data Independence
5	Database Languages and Interfaces
	The Database System Environment
6	Centralized and Client/Server Architectures for DBMSs
	Classification of Database Management Systems
7	Relational Model concepts
	The Relational Model Constraints and Relational Database Schemas
8	Mid Term Exam
9	Normalization
10	Functional dependencies
11	The Entity/Relational Data Model
12	Basic SQL
13	More SQL: Complex Queries, Triggers, Views, and Schema Modification
14	Relational Algebra
15	Relational calculus
16	Final Term Exam

Subject: IT Project Management – CS408

Class & Semester: Year 2, 4th Semester			
Credits: 3 Credits **Category:** core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments/ Homework/Class Attendance/Group Project		20
3	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Fundamental of Project Management	Joseph Heagney	Work Smart,Fourth Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Projects in Computing and Information Systems	Christian W. Dawson	Pearson Education , Second edition

Course Description:

This course is designed to provide the students pursuing software development awards some basic grounding in project management. This module explores further project planning and management in a more specific IS/ICT context, partly to prepare students for their industrial placement and Final year project but also future careers.

Course Objectives:

- Objective setting for projects
- Planning, including product/work breakdown, activity sequencing
- Project strategies and models e.g. waterfall, incremental, evolutionary
- Project execution and control, including quality control

- Project post mortems and reviews
- New development versus customization

Homework and class activity details

Throughout the semester, students are expected to attend the lecture hours and further more they are asked to do class activities and assignments. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic.

Detailed Course Outline:

Week	Contents
1	Introduction
	What are (computing) projects?
	What is research and The research process
2	Classifying research
	Choosing a project and writing a proposal
3	Project planning and risk management
	Risk management
4	Literature searching and literature reviews
5	Software development
6	The stage-wise and classical waterfall models (conventional models)
	Agile methods and Extreme programming (XP)
7	Top-down and bottom-up development
	Verification, validation and testing
	Solutions to selected exercises
8	Mid Term Exam
9	Controlling your project
	Presenting your project in written form
	Data presentation, Referencing material and avoiding plagiarism
10	Documenting software
	Writing papers
11	Presentation skills
	Demonstrating software and Viva voce examinations
12	Examiners and the marking of your project
	Taking your project further
13	Introduction to Entity-Relationship Modeling
	Taking your project further
14	Additional topics

	The future
15	Top ten tips for successful projects
	Summary
16	Final Term Exam

Subject: Operating Systems Concept –CS501

Class & Semester	**3rd** year, 5th semester		
Credits: 4 credits Pre-requisites: Lecture hours: 2 Lecturers each 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Evaluation		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Operating Systems Concept	Abraham Silberchats, Peter Baer Galvin and Greg Gagne	Wiley, 9th Edition 2013
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Operating Systems: Internals and Design	William Stallings	Peterson, 8th Edition 2015

Course Description:

In this course, students will become familiar with the basic principles of a personal computer, including the internal hardware, the operating system, and software applications. The focus of the course is on the fundamentals, learning and using the applications, and understanding the basic roles and responsibilities of the software, hardware, and operating system.

Course Objectives:

To provide a fundamental knowledge of Computer Science, this includes evolution of computers and its various components and applications. This subject also gives a complete overview of fields where computer science is used.

Learning Outcomes:

After completion of this course, Students should get an idea about their field of specialty and the subjects and topics covered in their bachelor degree.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Computer Systems Overview
3	Operating Systems Overview
4	Virtual Machines
5	Processes

6	Threads
7	Scheduling
8	Mid Term Exam
9	Main Memory
10	Virtual Memory
11	Concurrency and Synchronization
12	Input/output Systems
13	File Systems
14	File Systems Implementation
15	Evaluation and summary
16	Final Exam

Subject: Java Programming - CS502

Class & Semester	**Y**ear 2nd , 5th semester		
Credits: 3 credits Category: Core Lecture hours: 2 hours lecture and 2 hours practice			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Evaluation		10
2	Mid-term exam		20
3	Assignments		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Java How To Program 10th Edition	P. J. Deitel, H. M. Deitel	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Hands-on books when required	NA	NA

Course Description:

This an advanced java programming which is successors to several other programming course that have been taught before. Herein, advance java features and specific application of java should be taught to give a real understanding programming to students. In this course student may apply very sophisticated java GUI application, object oriented implementation of java or java application with web or other specific application.

Objectives:

To accomplish this course successfully, a well theoretical and practical schedule is required to be fixed by lecturer and also a particular application example with clear scenarios should be given to students at the beginning of the class. Lecturer should guide students through the course by introducing language features, tools and lead them to use them in an appropriate way.

Learning Outcomes:

By successful completion of this course students should be able to

- Describe java language structure
- Describe java usage in most relevant areas

- Describe advance features and APIs of java language
- Describe popular IDEs used for java application development
- Be able to use java's feature in an example application
- Be able to use IDEs in an advance manner
- Be able to put OOP's concepts in an appropriate manner

Detailed Course Outline:

Week No.	Topics
1	Introduction to JAVA, Programming concepts of Basic Java
2	Language Features, Data Types, Variables
3	Control Statements
4	OOPS Concepts, Writing your own Java Classes
5	Object and Classes
6	Inheritance and Polymorphism
7	Java Arrays and Strings and Wrapper classes
8	Mid Term Exam
9	Packages, Interfaces
10	Exception Handling
11	Nested Classes, Anonymous inner class
12	Lambda expression and Reflection API
13	Java Annotation and Enum types
14	Swing and Event handling
15	Packages and Interfaces
16	Final Exam

Subject: Web Development 2 – CS507

Class & Semester: Year 3, 5th Semester			
Credits: 1 Credits **Category:** Core **Lab hours :** 1 hour-session in a week 45 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	NA	
3	Final exam	80	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Beginning-ASP.NET-for-Visual-Studio-2015	William Penberthy	Wrox
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Getting Started with ASP.NET 4.5 Web Forms and Visual Studio	Brian West, Roger Ireland, Norman Smith, David I. Shepherd	Addison-Wesley

Course Description:

The aims of this module are to enable students to design and construct effective web-based business applications. The module will develop basic programming techniques but will then explore and apply them in greater practical detail. The use of objects will be investigated.
The pattern of teaching envisaged would involve a briefing session (or lecture) of up to two hour each week, when specific tasks would be set for the students. These tasks would normally be practical computer-related tasks, but could involve information-seeking. Students will receive support in tutorials for these tasks.

Course Objectives:

- L01 design and construct business applications including ecommerce web sites
- L02 understand and evaluate the architectural issues involved in web-based applications and the use of objects and components.
- L03 design components for an application

- L04 evaluate the role of case tools for web development
- L05 take account of the need for good interface design

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	Getting Started with ASP.NET 6.0
2	Building an Initial ASP.NET Application
3	Designing Your Web Pages
4	Programming in C# and VB.NET
5	ASP.NET Web Form Server Controls
6	ASP.NET MVC Helpers and Extensions
8	Mid Term Exam
9	Creating Consistent-Looking Websites
10	Navigation
11	Displaying and Updating Data
12	Introducing a practical ecommerce website
13	Finalize development of the practical project
14	Finalize development of the practical project
15	Course Review
16	Final Term Exam

Subject: System Administration and Maintenance – CS506

Class & Semester: Year 3rd , 6th Semester			
Credits: 3 **Pre-Requisites:** **Lecture hours :** 2 Joint-hours every week 90 minutes **Lab hours :** 2 Joint-session every week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments		10
3	LABs		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Linux System Administration	Vicki Stanfield Roderick W. Smith	Copyright © 2002 SYBEX Inc.,
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Linux Administration: A Beginner's Guide	WALE SOYINKA	Fifth Edition

Course Description:

The course cover the topics such as (1) basic Linux commands (2) user management (3) file and directory permissions, (4) package management (5) process management (6) Linux as router (7) secure remote administration (8) Linux servers (i.e. domain controller, DHCP, DNS) (9) RAID concept (10) logical volume manager, (11) server virtualization and performance analysis, and (12) network management and monitoring. This course is not about configuration rather than efficient usage of different technologies available. To ensure that students can use the theory in practical environment, sufficient numbers of LAB assignments are planned. Brief outline of the course is explained above which will be covered during semester, but the course is not limited to this outline, in case needed the outline can be further extended or squeezed.

Couse Objectives:

The course aims are to train the student for the following: manage and support a network infrastructure that based on open source software; Gain skills needed to create a networking services infrastructure design that supports the required network applications; Learn network solution technologies: including DHCP, DNS, domain controller, server virtualization and network management; Gain the knowledge and skills needed to design a security framework for small, medium, and enterprise networks by using open source applications.

Learning Outcomes:

By successful completion of the course, the students will be able to design efficient network infrastructure based on different network services. In addition, the students will learn how to manage the network and monitor effectively.

Detailed Course Outline:

Week No.	Topics
1	Introduction to Operating Systems
2	Linux Installation and Basic Commands
3	User Management
4	Directory Structure
5	File and Directory Permissions
6	Package management and process management
7	Linux as router and secure remote administration
8	Linux servers (i.e. domain controller, DHCP, DNS)
9	**Mid Term Exam**
10	Linux servers (i.e. domain controller, DHCP, DNS)
11	RAID concept
12	Logical volume manager
13	Server virtualization and performance analysis
14	Network management and monitoring
15	**Course Review**
16	**Final Exam**

Subject: Database II – CS526

Class & Semester: Year 3rd, 5th Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 2 hour-session in a week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Database systems: a practical approach to design, implementation, and management.	Connolly, Thomas M., and Carolyn E. Begg	Pearson Education, 2015.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Microsoft® SQL Server 2008 R2	Ray Rankins, Paul Bertucci, Chris Gallelli, Alex T.	Silverstein, 2011

Course Description:

This course is the supplement course of Database-I. The course will introduce students to advanced database theories, query processing, transaction management, emerging trends and practices to develop relational databases.

Course Objectives:

The students are expected to learn the following objectives.

- Design and implement relational databases using advanced techniques
- Understand distributed database/replication servers
- Implement various techniques to protect data within a database
- Understand advanced theories/tools related to business intelligence

Homework and class activity details

Throughout the semester the students are expected to work on given assignments based on the given lectures. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	Enhanced ERD
2	Relational Algebra
3	Query optimization
4	stored procedure
5	stored functions
6	Triggers
7	Transaction management:- Transaction support, concurrency controls, Database recovery
8	Mid Term Exam
9	Indexing
10	Database administration and security:- Data administration and database administration, Database security
11	Database administration and security:- Data administration and database administration, Database security – 2
12	Distributed DBMSs and replication servers:- Advantages and disadvantages of DDBMSs, Replication servers
13	Distributed DBMSs and replication servers:- Advantages and disadvantages of DDBMSs, Replication servers – 2
14	Business Intelligence:- Data warehousing concepts, OLAP, Data mining
15	Business Intelligence:- Data warehousing concepts, OLAP, Data mining - 2
16	Final Term Exam

Subject: Distributed Web – CS606

Class & Semester: Year 3, 6th Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Lab activities	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Distributed systems**	Tanenbaum, A. S., & Van Steen, M.	Prentice-Hall (2007)
2	**Web services platform architecture: SOAP, WSDL, WS-policy, WS-addressing, WS-BPEL, WS-reliable messaging and more.**	Weerawarana, S., Curbera, F., Leymann, F., Storey, T., & Ferguson, D. F.	Prentice Hall PTR.(2005)
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Service-oriented architecture: a field guide to integrating XML and web services.**	Erl, T.	Prentice Hall PTR.(2004)

Course Description:

This course focus on how Web services related to Service Oriented Architecture and become familiar with the pillar Web service specifications for XML, Schema, SOAP, WSDL and UDDI. Introduction to the concepts, technologies and techniques underlying and making Distributed Web.

Course Objectives:

The students are expected to learn the following objectives.

- A sound understanding of the principles and concepts involved in designing

distributed web and research trends in future services like SaaS.

- Understand the Web service stack and RESTful services.
- Understand the concept to build practical distributed web based system.

Homework and class activity details

Throughout the semester the students are expected to work in distributed web. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	**Introduction to Distributed systems**
	Main concept of distributed systems
2	Type of distributed system
3	Architecture
4	RMI & RPC
5	Web Services and XML Syntax and XML programming
6	Web Services Stack
	Service Transport HTTP,SMTP
	Service Discovery UDDI
7	Service Description WSDL (Web Service Description Language) Document Structure and components
8	Mid Term Exam
9	Service messaging SOAP
10	Service Oriented Architecture
11	Web as Distributed Systems
12	Representation State Transfer (REST)
13	REST Constraints and Architectural elements
14	HTTP and RESTful Services
15	Software as a Services (SaaS)
16	Final Exam

Subject: Human Computer Interaction – CS609

Class & Semester: Year 3rd, 6th Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 2 hour-session in a week 90 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Human-Computer Interaction	Alan Dix, Janet Finlay, Gregory Abowd & Russell Beale	Pearson, 3rd Edition, 2004.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	The essential guide to user interface design	Wilbert O Galitz	Wiley DreamTech, 3rd Edition, 2007.
2	Designing the Obvious: A Common Sense Approach to Web and Mobile Applications Design.	Robert Hoekman	Pearson Education, 2nd Edition, 2011
3	Human Computer Interaction	Panayiotis Zaphiris & Chee Siang Ang	City University of London, UK, 2009

Course Description:

This course is an introduction to Human-Computer Interaction (HCI), a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. The course considers the inherently multi- and interdisciplinary nature of HCI and situates various HCI issues in the organizational and societal contexts. It introduces theories of human psychology, principles of computer systems and user interfaces designs, a methodology of developing effective HCI for information systems, and issues involved in using technologies for different purposes. It is intended to give students an overview of the entire HCI field by covering major aspects of it. Students will have an opportunity to explore

further on topics of their interest. The course will thus provide a background for students to practice system design, selection, evaluation, and use with the knowledge of human characteristics, interaction styles, use context, task characteristics, and design processes.

Course Objectives:
The students are expected to learn the following objectives.

- Design, implement and evaluate effective and usable graphical computer interfaces.
- Describe and apply core theories, models and methodologies from the field of HCI.
- Describe and discuss current research in the field of HCI.
- Describe special considerations in designing user interfaces for older adults.

Homework and class activity details:
Throughout the semester the students are expected to work on given assignments based on the given lectures. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	History of HCI and interface technologies (paradigms and theory trends)
2	HCI research methods (qualitative and quantitative, i.e. lab studies, ethnography, field studies)
3	HCI research methods (qualitative and quantitative, i.e. lab studies, ethnography, field studies) - 2
4	System evaluation techniques and methods
5	Usability concepts and factors
6	Usability engineering and testing
7	Experimental Study Design and Statistical Analysis
8	Mid Term Exam
9	Ethical issues in HCI research and Usability (informed consent, privacy rights, effects of technology on society)
10	Ethical issues in HCI research and Usability (informed consent, privacy rights, effects of technology on society) - 2
11	Role of the use context
12	Role of user centered design for development of novel technologies, e.g. UbiComp

13	Role of user centered design for development of novel technologies, e.g. UbiComp - 2
14	Societal, ethical, and user research issues for novel technologies
15	Societal, ethical, and user research issues for novel technologies - 2
16	Final Term Exam

Subject: Information Security Concept – CS603

Class & Semester: Year 3rd, 6th Semester			
Credits: 3 **Lecture Hours :** 3 Joint-hours every week 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	First Quiz	10	
2	Mid-term exam	20	
3	Assignments	10	
4	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Fundamentals of Network Security	John E. Canavan	Pearson Inc.
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Network Security: The Complete Reference	Mark Rhodes-Ousley, Roberta Bragg, Keith Strassberg	1st Edition, McGraw Hill, 2003.
2	Network Security: A Beginner's Guide	Eric Maiwald,	2nd Edition, McGraw Hill Osborne Media, 2003.

Course Description:

The network security course cover the topics of (1) basic security concept, (2) threats, vulnerabilities, attacks (3) encryption, digital signature, certificate authorities (4) Cryptography, (5) management aspect (6) LAN security (7) technical (8) human aspects (9) policies and procedure and some recent topic examples. Students understand of various types of Security incidents and attacks, and learn methods to prevent, detect and react information security incidents To ensure that students can use the theory in practical environment, sufficient numbers of LAB assignments are planned.

Couse Objectives and Outcomes:

Students attending this course shall learn following topic:

-To become able to explain various Information security threat and controls for it.
-To become able to explain information security incident response.
-To become able to explain the usage of Common Key cryptography and Public Key cryptography.
-To become able to explain the mechanism to protect confidentiality and completeness of data.
-To become able to explain the mechanism to authenticate users and servers.
-To become able to analyze a security incident and develop a countermeasure.
- To become able to explain the professional ethics and law related information security.

Detailed Course Outline:

Week No.	Topics
1	Introduction to Course
2	Basic Information Security Concepts
3	Threats, Vulnerabilities, and Attacks
4	Security Threats
5	Security attacks for Server and Client systems
6	Risk Management process for Information systems
7	Students exercise Risk Management process
8	Information Security Management System (ISMS)
9	**Mid Term Exam**
10	Law and Regulation related to Information Security
11	Security Measure Cryptography
12	Common Key Cryptography
13	Public Key Cryptography
14	Data Integrity and Digital Signature
15	Authentication and PKI
16	**Final Exam**

Subject: Data Warehouse – CS612

Class & Semester: Year 3, 2th Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	Mid-term exam		20
2	Assignments/ Homework/Class Attendance/Group Project		20
3	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**The Data Warehouse Lifecycle Toolkit**	Kimball, R.	John Wiley & Sons. (2008)
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**The Data Warehouse? ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data.**	Kimball, R., & Caserta, J.	John Wiley & Sons. (2011)

Course Description:

This course will enable students to understand the general concept of data warehousing and ETL process.

Course Objectives:

Upon successful completion of this module students should understand the following

- Data warehousing architecture and flow.
- Data warehouse applications.
- Data warehouse modeling.

Homework and class activity details

Throughout the semester the students are expected to work in data warehouse. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	Introduction and background
2	Difference between data warehouse and OLAP.
3	Types and typical application of data warehouse
4	Data warehouse architecture
5	**De-Normalization**
	De-Normalization techniques
6	Issues of De-Normalization.
7	Online Analytical Processing (OLAP)
8	Mid Term Exam
9	Multidimensional Online Analytical Processing (MOLAP) vs Relational Online Analytical Processing (ROLAP)
10	**Dimensional Modeling (DM)**
	Process of dimensional modeling
11	Issues of dimensional modeling
12	Extract, Transform, and Load (ETL)
	Data extraction and transformation
13	Data cleansing
14	Issues of ETL
15	Presentation of their final projects
16	Final Exam

Subject: Cloud Computing – CS617

Class & Semester: Year 4, 7th Semester **Category:** Core			
Credits: 3 Credits **Pre-Requisites: TE3502** **Lecture hours :** 3 lecture-hours each of 135 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Cloud Computing: A Practical Approach	Anthony T .Velte, Toby J.Velte, Robert Elsenpeter	Tata McGraw Hill Edition, Fourth Edition, 2010
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Cloud Computing: SaaS, PaaS, IaaS, Virtualization,Business Models, Mobile, Security and more	Kris Jamsa	Jones & Bartlett Learning Company LLC, 2013
2	Cloud Security: A Comprehensive Guide to Secure Cloud Computing	Ronald L.Krutz, Russell vines	Wiley Publishing Inc., 2010.

Course Description:

Cloud Computing has drawn the attention of industries and researchers worldwide. Many

applications that are being built nowadays were developed to suit the needs of cloud environment. Hence it becomes necessary to have course in cloud computing which deals with the basics of cloud, different services offered by cloud, and security issues in cloud. In a nutshell, this course on cloud computing provides information on fundamental aspects of the cloud environment.

Course Objectives:

1. Learn about different deployment models of cloud and different services offered by cloud
2. Understand the technique of virtualization through theoretical concepts and practical training
3. become knowledgeable

Homework and class activity details

Throughout the semester the students are expected to work on different Cloud Technologies and Architectures. As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	**CLOUD COMPUTING BASICS:** Cloud computing components- Infrastructure- services- storage applications database services
2	Deployment models of Cloud- Services offered by Cloud- Benefits and Limitations of Cloud Computing Issues in Cloud security, Cloud security services and design principles
3	**VIRTUALIZATION FUNDAMENTALS:** Virtualization – Enabling technology for cloud computing-
4	**TYPES OF VIRTUALIZATION:** Server Virtualization- Desktop Virtualization – Memory Virtualization
5	Application and Storage Virtualization- Tools and Products available for Virtualization
6	**SAAS:** Getting started with SaaS- Understanding the multitenant nature of SaaS solutions- Understanding OpenSaaS Solutions
7	**PAAS:** Understanding Service Oriented Architecture- PaaS- Benefits and Limitations of PaaS
8	**Mid Term Exam**
9	**IAAS:** Understanding IaaS- Improving performance through Load balancing- Server Types within IaaS solutions- Utilizing cloud based NAS devices
10	**CLOUD DATA STORAGE:** Understanding Cloud based data storage- Cloud based backup devices- Cloud based database solutions- Cloud based block storage
11	**CLOUD APPLICATION DEVELOPMENT**
12	Client Server Distributed Architecture for cloud – Traditional apps vs. Cloud apps

13	**CLIENT SIDE PROGRAMMING MODEL:** Web clients. Mobile clients- Server
14	**SIDE PROGRAMMING TECHNOLOGIES**: AJAX, JSON, Web Services (RPC, REST)-
15	MVC Design Patterns for Cloud Application Development
16	Final Term Exam

Subject: Research Methods, Course Code: CS701

Class & Semester: 4th Year, 7th Semester			
Credits: 2 **Type:** Core **Lecture hours:** 1 Joint-hours every week 90 minutes **Lab hours:** No Lab Hours, Case Study and Assignments.			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	First Quiz		NA
2	Mid-term exam/Assignments Exam		20
3	Assignments		20
4	LABs		NA
5	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Writing in the Sciences: Exploring Conventions of Scientific Discourse, 2/e.	Penrose, Ann and Steven Katz	New York: Pearson, 2004. [ISBN 0-321-11204-0]
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Handbook		

Course Description:

Science Writing satisfies the University's requirement that undergraduates complete a course on 'real world' writing for situations occurring outside the classroom and for audiences other than a teacher. Specifically designed for students interested in further study in the computer science, technology and engineering. This course exposes students to the conventions of scientific prose in the genres of research articles and proposals. In addition, students will learn to accommodate scientific information to general audiences. It is expected that students taking this class will have a developing expertise in science, writing about science, writing ethics, report writing, technical and business writing and using technology in presentation for specific and intended audience and reader and finally bit of research

methodology.

Course Objectives:

- Understand professional writing by studying management communication contexts and genres, researching contemporary business topics, analyzing quantifiable data discovered by researching, and constructing finished professional workplace documents.
- Recognize, explain, and use the formal elements of specific genres of organizational communication: white papers, recommendation and analytical reports, proposals, memorandums, web pages, wikis, blogs, business letters, and promotional documents.
- Understand the ethical, international, social, and professional constraints of audience, style, and content for writing situations a.) Among managers or co-workers and colleagues of an organization, and b.) Between organizations, or between an organization and the public.
- Understand the current resources (such as search engines and databases) for locating secondary information, and also understand the strategies of effective primary data gathering.
- Understand how to critically analyze data from research; incorporate it into assigned writing clearly, concisely, and logically; and attribute the source with proper citation.
- Practice the unique qualities of professional rhetoric and writing style, such as sentence conciseness, clarity, accuracy, honesty, avoiding wordiness or ambiguity, using direct order organization, readability, coherence and transitional devices.
- Explore different format features in both print, multimedia and html documents, and develop document design skills.
- Revise and edit effectively in all assignments, including informal media (such as email messages to the instructor).

Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors and Service Learning contact representatives

Learning Outcomes:

At the end of the course the participant will be able to:

- Describe the scientific writing process and its key stages
- Reflect on what constitutes a research problem to be addressed in a scientific paper
- Organize and compose a scientific paper in accordance with the IMRAD (Introduction, Methods, Results and Discussion) model
- Analyze and review scientific papers in terms of key message, consistency and justification
- Reflect on the benefits of working in teams in scientific writing and describe the rules of co-authorship
- Reflect on the ethics in scientific writing.
- Will have the general understanding of research mythology
- Reflect and be able to differentiate the technical writing, business writing, email writing and scientific writing
- Reflect and will be able to draft a scientific paper
- Reflect and will be able to draft and write proposal
- Reflect and will be able to have effective writing communication both in business and science

Detailed Course Outline:

Week No.	Topics
1	**Lecture1:** Introduction to course policy, plane, outline and syllabus
2	**Lecture2:** Introduction to scientific writing, technical writing, research methodology and general concepts
3	**Lecture3**: Analysis of Scientific Disciplines Forums of Scientific Communication.
4	**Lecture4**: Intro Assignment #1 Ethics
5	**Lecture5**: Discussion section Discussion of Interviews Grammar Punctuation
6	**Lecture6**: Emphasis Tone Collaborative editing
7	**Lecture7**: Review Articles Assignment
8	**Lecture8**: Accommodation Audience Analysis
9	Mid Term Exam
10	**Lecture9**: Review Articles, Discussion of Topics Research of Topics
11	**Lecture10** : Research Skills, Personal Statements Resumes Audience Analysis.
12	**Lecture11**: Application Materials Concision, Procedures and Instructions
13	**Lecture12**: Proposals, Final Project
14	**Lecture13**: Presentations Posters PowerPoint Document Design

15	**Course Review**
16	**Final Exam**

Subject: Mobile Application Development – CO702

Class & Semester: Year 4, 7th Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Android Developer Fundamentals Course (Concept & Practical)**	Google Developer team	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Professional Android 4 Application Development	Reto Meier	2012
2	Head First Android Development	Dawn Griffiths & David Griffiths	2015

Course Description:

This course aims to introduce students to the design and implementation of Android applications for mobile devices. Students will develop an app from scratch, assuming a basic knowledge of Java, and learn how to set up Android Studio, work with various Activities and create simple user interfaces to make your apps run smoothly.

Course Objectives:

By successful completion of the course, students will gain basic knowledge of today mobile applications market, trends, and frameworks. Moreover, they will be able to design and develop Android based mobile applications.

Homework and class activity details

As a preparation towards the lecture, the students are expected to read the reading material ahead of

time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments

Detailed Course Outline:

Week	Contents
1	Build Your First App • Intro to Android • Create Your First Android App •
2	• Layouts, Views and Resources • Text and Scrolling Views
3	Activities and Intents: • Activities and Intents • Activity Lifecycle and Saving State • The Android Support Library
4	• Activities and Implicit Intents
5	Testing, debugging, and backwards compatibility • Debugging Your App • Testing Your App • The Android Support Library
7	User interface • User Input Controls • Menus
8	Mid Term Exam
9	Screen Navigation • TabLayout • Navigation Drawer
10	RecyclerView
11	Drawables, Themes and Styles
12	Providing resources for adaptive layouts
13	Background tasks • AsyncTask and AsyncTaskLoader
14	Connecting to the Internet
15	Problem Solving and Review
16	Final Exam

Subject: Design Patterns – CO706

Class & Semester: Year 4, 1st Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Head First Design Patterns	Eric, Elisabeth	O'Reilly
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Design Patterns, Elements of Reusable Object-Oriented Software	Erich, Gamma	Addison-Wesley

Course Description:

This course introduces the concept of design patterns: their origins in architecture and how they apply in the discipline of software design. The motivation for studying design patterns, what they are and how to use them .After completing this course, students will be comfortable with the basics of design patterns and will be able to start using them effectively.

Course Objectives:

At the end of this course, students will be able to understand what design patterns are, know why they are useful. Students will also get familiar with several specific design patterns and how to relate them to their day to day java programming work. What each pat-tern is, where they are used, and how they are implemented.

Homework and class activity details

Throughout the semester the students are expected to work on case studies in the book and assignment which lecturer will give them.

Detailed Course Outline:

Week	Contents
1	Introduction to DP
2	Java Overview
3	What is design pattern?
4	Observer pattern
5	Cont. Observer pattern
6	Decorator pattern
7	Cont. Decorator pattern
8	Mid Term Exam
9	Factory pattern
10	Cont. Factory pattern
11	Singleton pattern
12	Cont. Singleton pattern
13	Command Pattern
14	Cont. Command Pattern
15	**Course Review**
16	Final Term Exam

Subject: IS Strategy, Management & Acquisition (ISSMA) – CS712

Class & Semester: Year 4, 7th Semester			
Credits: 3 Credits **Category:** Core			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Information Systems Strategic Management: An Integrated Approach**	Steve Clark	Routledge
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			
2			
3			

Course Description:

This course explores the issues and approaches in managing the information systems function in organizations and how the IS function integrates / supports / enables various types of organizational capabilities. It takes a senior management perspective in exploring the acquisition, development and implementation of plans and policies to achieve efficient and effective information systems. The course addresses issues relating to defining the high-level IS infrastructure and the systems that support the operational, administrative and strategic needs of the organization. The remainder of the course is focused on developing an intellectual framework that will allow leaders of organizations to critically assess existing IS infrastructures and emerging technologies as well as how these enabling technologies might affect organizational strategy. The ideas developed and cultivated in this course are intended to provide an enduring perspective that can help leaders make sense of an increasingly globalized and technology intensive business environment.

Course Objectives:

- Understand the various functions and activities within the information systems area, including the role of IT management and the CIO, structuring of IS management within an organization, and managing IS professionals within the firm.
- View an organization through the lens of non-IT senior management in deciding how information systems enable core and supportive business processes as well as those that interface with suppliers and customers.
- Understand the concepts of information economics at the enterprise level.
- Appreciate how IS represents a key source of competitive advantage for firms.
- Structure IS-related activities to maximize the business value of IS within and outside the company.
- Understand existing and emerging information technologies, the functions of IS and its impact on the organizational operations.
- Evaluate the issues and challenges associated with successfully and unsuccessfully incorporating IS into a firm.
- Understand how strategic decisions are made concerning acquiring IS resources and capabilities including the ability to evaluate the different sourcing options.
- Apply information to the needs of different industries and areas.
- Understand the role of IT control and service management frameworks from the perspective of managing the IS function in an organization.

Homework and class activity details

As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments.

Detailed Course Outline:

Week	Contents
1	The IS function
2	IS strategic alignment
3	Strategic use of information
4	Impact of IS on organizational structure and processes
5	IS economics
6	IS planning
7	
8	Mid Term Exam
9	**Role of IS in defining and shaping competition**
10	Managing the information systems function
11	Financing and evaluating the performance of information technology investments and operations
12	Acquiring information technology resources and capabilities

13	Using IS/IT governance frameworks
14	IS risk management
15	Managing business continuity
16	Final Term Exam

Subject: Advance Database Management system – CS713

Class & Semester: Year 4, 7tt Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	MongoDB: The Definitive Guide	Kristina Chodorow & Michael Dirolf	
2	NoSQL Databases	Christof Strauch	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Spring Data MongoDB – Reference Documentation		

Course Description:

The widespread emergence of big data storage needs has driven the development and adoption of a new class of non-relational databases commonly referred to as NoSQL databases. This course will explore the origins of NoSQL databases and the characteristics that distinguish them from traditional relational database management systems. Core concepts of NoSQL databases will be presented, followed by an exploration of how different database technologies implement these core concepts. We will take a closer look at 1-2 databases from each of the four main NoSQL data models (key-value, column family, document, and graph), highlighting the business needs that drive the development and use of each database. Finally, we will present criteria that decision makers should consider when choosing between relational and non-relational databases and techniques for selecting the NoSQL database that best addresses specific use cases.

Course Objectives:

The student should know and understand:

- The differences between a relational database and a non-relational (NoSQL) database
- How to choose a suitable database for an application
- How to program a number of NoSQL databases to store and retrieve data and perform aggregation functions
- The concepts of replication, distribution, sharing, and resilience in a NoSQL database.
- The ability to analyze semi-structured data and choose an appropriate storage structure

Homework and class activity details

As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments

Detailed Course Outline:

Week	Contents
1	Comparison of relational databases to new NoSQL stores
2	Introduction to MongoDB
	Introduction to Cassandra
3	**Introduction to Neo4j installation, use and deployment.**
4	MongoDB-A Database for the Modern Web
5	Practical experience with MongoDB
6	Documents and Collections
	Simple Queries
7	Simple Updates and Deletes
8	Mid Term Exam
9	**Advanced**
	More Complex Types of Queries
10	Updates and Arrays
	Indexing and aggregation
11	MapReduce
12	Mongo Security
13	Cont. Mongo Security
14	Mongo Replication and Sharing

15	Course review and problem solving
16	Final Term Exam

Subject: Advanced Mobile Application Development – CS802

Class & Semester: Year 4, 8th Semester			
Credits: 3 Credits **Category:** Core **Lab hours :** 4 hour-session in a week 180 minutes			
EVALUATION			
S. No	**Quizzes and exams**	**Mark distribution**	
1	Mid-term exam	20	
2	Assignments/ Homework/Class Attendance/Group Project	20	
3	Final exam	60	
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Android Developer Fundamentals Course (Concept & Practical)**	Google Developer team	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Professional Android 4 Application Development	Reto Meier	2012
2	Head First Android Development	Dawn Griffiths & David Griffiths	2015

Course Description:

Advanced Mobile Application Development (AMAD) is designed to familiarize students with intermediate to advance concepts of mobile application development.

Course Objectives:

Upon successful implementation of this course, students will be able to design and develop a native mobile application for android handheld systems. They will understand the following:

- Save, retrieve and manipulate data using a different approach.
- Share data across applications using content providers
- Set permission and use defined permissions
- Analyze application performance and security

Homework and class activity details

As a preparation towards the lecture, the students are expected to read the reading material ahead of time. Each student is expected to answer selected questions relevant to the topic. The students will also be asked to prepare and present a topic related to the group project that is most interesting to them and present their contribution in the assignments

Detailed Course Outline:

Week	Contents
1	Broadcast receivers
2	Services
3	Triggering, scheduling, and optimizing background tasks • Notifications • Alarm managers
4	Triggering, scheduling, and optimizing background tasks • Transferring data efficiently (Job Scheduler)
5	**Data -- saving, retrieving, and loading** • Concepts: Overview to storing data • Shared preferences
6	App with Settings
7	SQLite • SQLite primer • Storing data with SQLite
8	Mid Term Exam
9	Sharing Data Across Applications • ContentProviders
10	Loaders • Loading data using loaders • Using loaders to load and display data
11	Permission and Performance
12	Security
13	Firebase and AdMob
14	Publish your app
15	Problem Solving and Review
16	Final Term Exam

References

1. IS 2010. Curriculum Guidelines for Undergraduate Degree Programs in Information Systems. Association for Computing Machinery (ACM), Association for Information Systems (AIS)
2. IS'15 - A Model Curriculum reflecting the emerging IS Profession. 2013 Proceedings of the Information Systems Educators Conference, San Antonio, Texas, USA
3. CS 2013. Computer Science Curricula 2013. Curriculum Guidelines for Undergraduate Degree Program in Computer Science. December 20, 2013.
4. SE 2014. Software Engineering 2014. Curriculum Guidelines for Undergraduate Degree Program in Software Engineering. February 23, 2015.