Kabul Polytechnic University

Department OF NETWORK Engineering (NE)

2018

Faculty of Computer Science

Karte Mamourin, Kabul, Afghanistan

Table of Contents

Kabul Polytechnic University
Department of Network Engineering

The Vision

NE – Network Engineering is a governmental academic department in Faculty of Computer Science at Kabul Polytechnic University. NE's predecessor was a department called Computing Information Science (CIS) in which mostly two very general principles of computer science, namely networking and theoretical Computer Science have been covered since 2008. Since the market demands and the academia have become more professional and specific, it has been decided to develop a new curriculum concentrating more on network and telecommunication engineering. The new curriculum with more focused orientation imposed to choose the name NE to reflect curriculum contents. NE envisions to provide a standard Bachelor degree program and conduct researches in this direction. We are promising to make a global level education and research background record by graduating new generations and publishing state-of-the-art research papers in our professional career.

The Goal

The curriculum aimed to provide outcome based education to fulfill two key goals for NE graduates, first to educate them to gain market required skills in the area of network and communication and second to build a strong educational base for their further studies. In addition, NE's academic members will conduct researches to build a strong career.

The Objectives

1. Periodic revision of curriculum based on new market needs and technology changes.
2. Assessing the curriculum implementation and effectiveness during its effective course of time.
3. Assessing individual subject's syllabuses to keep it aligned with defined goal and direction.
4. Conducting researches and appearing in conferences to deliver our research results.
5. Encouraging IT industries and employers to contribute in our curriculum development by creating a development and industry committee.

Subject Categories

In this bachelor degree program, the subjects are divided into four categories according to the requirements of Ministry of Higher Education of 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)
- Elective subjects (should be)
- Project (should be more than 8% of overall degree credits)

The details of each category is given below.

1. 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 History	CO102	1	1	
3	Elementary English	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		2	1	
3	Elective -3		3	2	
4	Elective 4		4	2	
5	Elective 5		5	2	
6	Elective 6		6	2	
7	Elective 7		7	2	
8	Elective 8		8	2	
Total				**14**	

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-1	CS101	1	4	
2	Computer Skills	CS102	1	3	
3	Calculus-1	EL102	1	3	
4	Fundamental of Electronics	CS106	1	2	
5	Introduction to Programming-2	CS201	2	4	CS101
6	Functional English	EL201	2	2	
7	Discrete Mathematics	EL202	2	3	
8	Probability Theory and Statistics	EL302	3	3	
9	Object Oriented Programming	CS301	3	3	CS201
10	English Reading Comprehension	EL301	3	2	EL201
11	Web Design	CS304	3	3	
12	English Writing Composition	EL401	4	2	EL301
13	Linear algebra with Matlab	EL402	4	2	EL302
Total				**36**	

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	Research Methodology	CS701	7	2	
4	Thesis	CS801	8	12	
Total				18	

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 Network Engineering and are consist of the largest portion of credits.

No	Subject	Code	Semester	Credit	Pre-Requisite
1	Computer Fundamentals	CS103	1	3	
2	Digital Logic and Design	CS207	2	3	
3	Data Communication	CS206	2	3	
4	Network Fundamentals	CS302	3	3	CS206
5	Database Concepts	CS303	3	3	
6	Computer Networks	CS402	4	3	CS302
7	Data Structures and Algorithms	CS401	4	4	CS301
8	Advanced Database	CS405	4	2	CS303
9	Web Development	CS404	4	3	CS304
10	Operating Systems Concept	CS501	5	3	
11	Wireless Networks	CS505	5	3	CS302
12	Software Engineering	CS515	5	3	
13	Routing and Switching Lab	CS513	5	2	CS302
14	System Administration and Maintenance	CS506	5	3	
15	Specialization 1[1]		5	2	
16	Advanced Networks	CS607	6	3	CS302
17	Unix-based Operating System	CS602	6	2	
18	Information Security Management	CS603	6	3	
19	Specialization 2		6	2	
20	ICT4D	CS610	6	3	

[1] Specialization subjects should be listed as others

21	Advanced Java Programming	CS604	6	3	CS301
22	Mobile Application Development	CS702	7	3	CS604
23	Network Security	CS705	7	3	
24	Transmission Networks	CS709	7	3	
25	Embedded Systems (Python)	CS705	7	3	
26	Cellular Networks	CS717	7	3	
27	Specialization 3		7	2	
28	Specialization 4		8	4	
Total				77	

Summary of Overall Credits

Subjects	Credits	Percentage	Criteria of MoHE
General	12	8%	
Elective	6	4%	
Total General and Elective	18	12%	< 12%
Basic	36	24%	< 30%
Projects	18	12%	> 8%
Core	77	52%	> 50%
Total Credits	149	100%	> 136 and < 168

Semesters-wise Courses Summary

First Year: First Semester

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching Department	Total Hrs.	Pre-Requisite
1	Introduction to Programming-1	CS101	CORE	4	2	4		NE	6	
2	Computer Skills	CS102	BASIC	3	2	2		NE	4	
3	Computer Fundamentals	CS103	BASIC	3	2	2		NE	4	
4	Islamic culture-1	CO101	GENERAL	1	1			IC	1	
5	Modern History	CO102	GENERAL	1	1			IC	1	
6	Elementary English	EL101	GENERAL	2		4		FA	4	
7	Calculus-1	EL102	BASIC	3	2	2		MA	4	
8	Fundamental of Electronics	CS106	BASIC	2	1	2		CS	3	
9	Elective -1		ELECTIVE	1	1	1			1	
				20					28	

Elective – 1

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	Introduction to Specialty	CS104	Elective	1	1		NE	1
2	Sport	GE101	Elective	1		2	Sport	2

Second Semester

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching Department	Total Hrs	Pre-Requisite
1	Introduction to Programming-2	CS201	CORE	4	2	4		NE	6	NE101
2	Digital Logic and Design	CS207	CORE	3	2	2		NE	4	
3	Data Communication	CS206	CORE	3	2	2		NE	4	
4	Islamic Studies – 2	CO201	GENERAL	1	1			IC	1	
5	Modern History of Afghanistan – 2	CO202	GENERAL	1	1			IC	1	
6	Functional English	EL201	BASIC	2		4		FL	4	
7	Discrete Mathematics	EL202	BASIC	3	2	2		MA	4	
8	Elective -2		ELECTIVE	1				NE	1	
				18					25	

Elective-2

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	Usage of Electronic devices	CS211	Elective	2	1	2	CE	3
2	Introduction to Internet Services	CS210	Elective	2	1	2	NE	3
3	Sport	GE201	Elective	1	0	2	Sport	2

Second Year: Third Semester Syllabus

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching Department	Total Hrs	Pre-Requisite
1	Network Fundamentals	CS302	CORE	3	2	2		NE	4	
2	Database Concepts	CS303	CORE	3	2	2		IS	4	
3	Probability Theory and Statistics	EL302	BASIC	3	2	2		MA	4	
4	Object Oriented Programming	CS301	CORE	3	2	2		SE	4	CS201
5	Islamic culture - 3	CO301	GENERAL	1	1			IC	1	
6	English Reading Comprehension	EL301	BASIC	2		4		FL	4	
7	Web Design	CS304	BASIC	3	2	2		IS	4	
8	Elective -3		ELECTIVE	2	1	2		SE	3	
				20					28	

Elective-3

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	Automata Theory	CS312	Elective	2	1	2	SE	3
2	Circuit Theory	CS313	Elective	2	1	2	CE	3

Fourth Semester Syllabus

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching department	Total	Pre-Requisite
1	Computer Networks	CS402	CORE	3	2	2		NE	4	CS302
2	Data Structures and Algorithms	CS401	CORE	3	2	2		SE	4	
3	Advanced Database	CS405	CORE	3	2	2		IS	4	CS303
4	Web Development	CS404	CORE	3	2	2		IS	4	
5	Islamic Culture - 4	CO401	GENERAL	1	1			IC	1	
6	English Writing Composition	EL401	BASIC	2		4		FL	4	
7	Linear algebra with Math lab	EL402	BASIC	3	2	2		MA	4	
8	Elective 4		ELECTIVE	2				-	3	
				18					28	

Elective – 4

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	System Analysis and Design	CS410	Elective	2	1	2	IS	3
2	Computer Architectures	CS409	Elective	2	1	2	NE	3

Third Year: Fifth Semester Syllabus

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching department	Total Hours	Pre-Requisite
1	Educational Practice	CS503	PROJECT	2			2	NE	2	
2	Islamic Culture - 5	CO501	GENERAL	1	1			IC	1	
3	Operating Systems Concept	CS501	CORE	3	2	2		NE	4	
4	Wireless Networks	CS505	CORE	3	2	2		NE	4	
5	Software Engineering	CS515	CORE	3	2	2		SE	4	
6	Routing and Switching Lab	CS513	CORE	2	0	4		NE	4	CS402
7	System Administration and Maintenance	CS506	CORE	3	1	4		NE	5	
8	Elective 1		Elective	2				NE	3	
				19					**27**	

Elective – 5

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	Introduction to Information Systems	CS514	Elective	2	1	2	IS	3
2	Introduction to Telecom Systems	CS525	Elective	2	1	2	NE	3

Sixth Semester Syllabus

No	Subject	Code	Category	Credit	Theory	Practical	Stage/Seminar	Teaching department	Total	Pre-Requisite
1	Advanced Networks	CS607	CORE	3	2	2		NE	4	
2	Unix based OS	CS602	CORE	3	2	2		NE	4	CS501
3	Information Security Concept	CS603	CORE	3	2	2		SE	4	
4	Productive Practice (Internship)	CS601	PROJECT	2			4	NE	2	
5	Islamic Studies – 6	CO601	GENERAL	1	1			IC	1	
6	Elective 6		Elective	2				NE	4	
7	Cloud Computing	CS617	CORE	2	2	0		NE	2	
8	Advanced Java Programming	CS604	CORE	3	2	2		SE	4	
				20					**27**	

Elective – 6

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	Network Operation & Maintenance	CS623	Elective	2	2	0	NE	2
2	Embedded Systems	CS611	Elective	3	2	2	CE	4
3	ICT4D	CS610	Elective	3	2	2		SE

Fourth Year: Seventh Semester Syllabus

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching department	Total	Pre-Requisite
1	Mobile Application Development	CS702	CORE	3	2	2		IS	4	
2	Network Security	CS705	CORE	3	2	2		NE	4	CS603
3	Transmission Networks	CS709	CORE	3	2	2		NE	4	
4	Islamic Culture - 7	CO701	GENERAL	1				IC	1	
5	Open-Source System Administration	CS719	CORE	2	2	2		NE	4	
7	Cellular Networks	CS717	CORE	3	2	2		NE	4	
8	Diploma Project Guide	CS723	BASIC	1			1	NE		
9	Research Methodology	CS701	BASIC	2	1		2		3	
10	Elective 7		Elective	2				NE	2	
				20					**26**	

Elective – 7

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	Microwave and Satellite Communication	CS721	Elective	2	1	2	NE	3
2	Modern Technologies	CS722	Elective	2	1	2	NE	3

Semester 8

No	Subject	Code	Category	Credit	Theory	Practical	Stage/seminar	Teaching Department	Total	Pre-Requisite
1	Diploma Project	CS801	PROJECT	12	4		24	NE	28	
2	Islamic Studies - 8	CO801	GENERAL	1	1			IC	1	
3	Distributed Network Systems		CORE	4					5	
	Elective-1		Elective	2					10	
				19						

Elective – 8

No	Subject	Code	Category	Credit	Theory	Practical	Teaching department	Total Hours
1	ICT Policy	CS807	Elective	4	3	2	NE	5
3	Advanced Mobile Application Development	CS802	Elective	4	2	2	IS	4
4	Creativity Development	CS812	Elective	2	1	2		3

GENERAL SUBJECTS

Course Name: Islamic culture - 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**

Course Name: Islamic culture – 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	البيهقی, ابوبکر احمد بن الحسين	بيروت دارالکتب العلميه الطبعه
2	الاحکام الشرعيه اکبری	البيهقی, ابو محمد عبدالحق	الرياض: مکتبه الرشد.
3	ماذا خسرالعام بانحطاط المسلمين	ندوی, ابوالحسن.(ب ت)	چاپ دوم
4	الحکام الشرعيه الکبری	الاشبيلی, ابو محمد عبدالحق	الرياض: مکتبه الرشد
5	بررسی 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**

Course Name: Islamic culture – 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 الاالثه.
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**

Course Name: Islamic culture – 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**

Course Name: Islamic culture – 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**

Course Name: Islamic culture – 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**

Course Name: Islamic culture – 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**

Course Name: Islamic culture – 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**

Subject: Contemporary History of Afghanistan 1 – 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	
3	تاریخ مختصر افغانستان	محمد ابراهیم عطایی	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**

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 2 – 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	
3	تاریخ مختصر افغانستان	محمد ابراهیم عطایی	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**

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**

BASIC SUBJECTS

Subject: Computer Fundamentals – CS103

Class & Semester	**1st** year, 1st semester		
Credits: 3 credits **Category:** Basic **Lecture hours:** 2 Lectures – 90 minutes **Lab Hours:** 2 Practical Labs – 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	Discovering Computers,	Shelly and Vermaat	Thomson Course Technology, 4th Edition 2016
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Organization, Design and Architectures	Sajjan Shiva	Fourth Edition, 2007
2	Computer Science: An overview	Dennis Brylow, Glenn Brookshear	Pearson Education Limited,12th edition, 2014

Course Description:

In this course, students will become familiar with the basic principles of modern computers. The focus of the course is to give a broad overview of digital computers, networks of computers, components of computers, computer programs, computer languages, computer usage in different areas, etc.

Course Objectives:

To familiarize the students of the first semester about the concepts of computers, how computers are important in the daily life. Likewise this course will help students to understand the basic ideas of different upcoming subjects.

Learning Outcomes:

After completion of this course, Students should get an idea about computer structures, operating systems and their services, computer programs, computer networks, logic gates,

binary and hexadecimal numbering systems, etc.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Introduction to computers: Evolution, history, types, purposes, etc.
3	The System Unit Components
4	Input and Output Devices
5	Storage Devices
6	Computer Programs and Languages
7	Computer Programs and Languages
8	Mid Term Exam
9	The Role of Operating systems in computers
10	Concept of Database Systems
11	Introduction to the Internet and Networks
12	Numbering systems
13	Basic Logic Gates
14	Computer Graphics
15	Computer Security and Antivirus
16	Final Exam

Subject: Computer Skills – CS102

Class & Semester: Year 1, 1st Semester			
Credits: 3 Credits **Category:** Basic **Lecture Hours:** 2 hours session in a week – 90 minutes **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/ Homeworks/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-OFFICE 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, home works, presentations, etc in MS-OFFICE.

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, auto shapes, 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: General Mathematic – EL102

Class & Semester: 1st year , 1nd 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	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. It consists 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, physics 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: Fundamentals of Electronics – CS1106

Class & Semester: 1st year , 1st 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	College Physics.	Etkina, Eugenia, Michael Gentile, and Alan Van Heuvelen.	San Francisco, CA: Pearson, 2014
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	College Physics: A Strategic Approach.	Knight, Randall D., Brian Jones, and Stuart Field.	2nd ed., AP® ed. Boston: Pearson, 2013.
2	Physics: Interactive Illustrations, Explorations and Problems for Introductory Physics	Christian, Wolfgang, and Mario Belloni.	Prentice Hall, 2004.

Course Description:

This course provides opportunities for students to develop understanding of the foundational principles of Kinematics, dynamics, gravitation and cellular motion, energy, linear momentum, simple harmonic motion, mechanic waves, electrostatics and electrical circuits.

Couse Objectives:

The purpose of this course is to provide an understanding of physical concepts and underlying various engineering and technological applications. In addition, the course is expected to develop scientific temperament and analytical skill in students, to enable them logically tackle complex engineering problems in their chosen area of application.

Learning Outcomes:

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

- Demonstrate an advanced level knowledge and understanding of the laws of classical mechanics to include representing these laws in mathematical expressions with appropriate units for physical quantities.
- Show quantitative and analytical skills necessary to solving physics/engineering problems.
- Exhibit effective written communication skills in presentations of physics/engineering

homework problems.

Detailed Course Outline:

Week No.	Topics
1	Course overview
2	Kinematics
3	Dynamics
4	Circular motion and gravitation
5	Energy I
6	Energy II
7	Momentum
8	**Midterm exam**
9	Simple harmonic motion
10	Rotational motion
11	Mechanical waves
12	Electrostatics
13	DC circuits
14	DC circuits ii
15	Course review
16	Final exam

Subject: General English – 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.
- To 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 suggestions
- 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: General English – EL201

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: Discrete Mathematics – CS202

Class & Semester: 2rd year , 3rd 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
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:

- To apply reading strategies including extracting main ideas, reading for details.
- To read the authentic text comprehensively.
- To 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 , 4th 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, hyper geometric, 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: Web Design – CS304

Class & Semester: Year 2nd, 4th Semester			
Credits: 3 Credits **Pre-requisites:** **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		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	HTML the Complete Reference	Thomas A. Powel	McGraw Hill 5th Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	JavaScript Handbook	Danny Goodman	IDG books 4th Edition

Course Description:

This course will provide a basic understanding of the methods and techniques of developing a simple to moderately complex web site. Using the current standard web page language, students will be instructed on creating and maintaining a simple web site. After the foundation language has been established, the aid of a web editor will be introduced.

Couse Objectives:

- Learn how to design and develop a Web page using HTML and CSS.
- Learn how to link pages so that they create a Web site.
- Design and develop a Web site using text, images, links, lists, and tables for navigation and layout.
- Style your page using CSS, internal style sheets, and external style sheets.
- Learn how to use graphics in Web design.

Learning Outcomes:

At the conclusion of the course, students should be able to:

- Create local HTML pages and move them to a remote web server.
- Design and develop basic web pages using HTML and CSS.
- Use graphics in Web pages.
- Use tables in Web pages.
- Link pages so that they create a Web site.
- Design and develop web pages using CSS styles, internal and/or external style sheets.
- Design and develop web pages using CSS for layout.

Detailed Course Outline:

Week No.	Topics
1	Introduction to Course
2	Web design & HTML
3	CSS: Creating a CSS Page, CSS Text Effects, CSS Box Effects, Photoshop to CSS
4	CSS: Tables and More Selectors CSS Floats CSS Grouping/Nesting CSS Dimension CSS Display CSS Positioning Coding a Float-Heavy Theme
5	CSS: CSS Align CSS Pseudo-class CSS Pseudo-element
6	CSS Navigation Bar CSS Image Gallery CSS Image Opacity CSS Image Sprites CSS Media Types CSS Attribute Selectors
7	Pseudo-Selectors What is JavaScript? JavaScript Fundamentals
8	**Mid Term Exam**
9	Functions
10	Arrays
11	Editing CSS with JavaScript A JavaScript Shopping Interface
12	Initializing jQuery
13	jQuery To-Do List
14	More jQuery Methods
15	**Course Review**
16	**Final Exam**

Subject: Academic Writing – EL401

Class& Semester: 2nd year , 4th Semester			
Credits: 2 Credits **Pre-requisites: EL401** **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

- To understand the writing 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: Linear Algebra in Matlab – EL402

Class & Semester: 2nd year , 4th Semester			
Credits: 3 Credits **Pre-requisites:** **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	Linear Algebra and its Applications	David C. Lay	Pearson Education, Inc 3rd edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Introductory Linear Algebra	Howard Anton and Chris Rorres	John Willy & Sons, INC 8th Edition
2	Introductory Linear Algebra with Applications	B. Kolman	Prentice Hall 6th Edition

Course Description:

This is a basic subject on matrix theory and linear algebra. Emphasis is given to topics that will be useful in other disciplines, including systems of equations, vector spaces, determinants, eigenvalues, similarity, and positive definite matrices. The students will work in Matlab to implement the concepts of Linear Algebra.

Couse Objectives:

The goals of this subject are, how we can use Linear Algebra and its numerical applications in different fields.

Learning Outcomes:

Upon completing this course student should be able:

- To master the techniques for solving systems of linear equations.
- To introduce matrix algebra as a generalization of single-variable algebra of high school.
- To build on the background in Euclidean space and formalize it with vector space theory.

- To relate linear methods to other areas of mathematics such as calculus and differential equations.
- To develop an appreciation for how linear methods are used in a variety of applications.

Detailed Course Outline:

Week No.	Contents
1	Decimal & Binary system , Round off, scientific system
2	Error on operations , Horner method, divers, resident
3	Introduction to MATLAB , Counting with MATLAB
4	Operation on Matrix, Using MATLAB on matrix
5	Determinant, Determinant of Matrix , Using MATLAB on Determinant
6	Using MATLAB on Mathematical function, Invers, Numerical operation
7	Invers of matrix, Liner Equation systems
8	**Mid Term Exams**
9	Non Liner Equation Introduction, Iteration Method, Newton Method for Numerical Roots Leaner Interpolation Mathod
10	Using of MATLAB on Basic Counting , Approximation Interpolation
11	Integrals, Derivative Introduction, Solve Integrals by MATLAB, Using MATLAB on Derivative
12	Trigonometry Using of MATLAB , Using of MATLAB on Victors
13	Factorial, Limits, Vectors , Introduction, Using of MATLAB on
14	Victors, Complex Number , Graph of Function , Introduction, Using of MATLAB, Using of MATLAB **for drawing of Function**
15	**Deferential equation , In**troduction, Using of MATLAB on
16	**Final Exam**

CORE SUBJECTS

Subject: Introduction to Programming 1 – CS101

Class & Semester: Year 1st , 1st Semester			
Credits: 4 Credits **Category: Basic** **Lecture hours :** 2 Joint-hours every week 90 minutes **LAB hours :** 4 Joint-hours every week 180 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 using Turbo++	Robert Lafore	
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 basic of programming language using C++, which is important for higher level programming. After completing this course, the students will be able to make small and medium programs.

Couse Objectives:

The course covers the essentials of the C programming language while staying away from object-oriented concepts. The premise is that a good grounding in structured programming will be required when moving into the object-oriented domain that would be covered in depth in a later course. After covering file-handling and unions and structures, the course will finally introduce

the concept of classes and public and private members with an introduction to function overloading.

Learning Outcomes:

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

- Analyze, design, and solve real world problems in C ++
- Understand the importance of modular program structure and reusability
- Understand object oriented programming
- Understand the difference between procedural and object oriented paradigms

Detailed Course Outline:

Week No.	Outline of syllabuses
1	Introduction to algorithms
2	Flowchart part-1(Introduction)
3	Flowchart second part(Real Based Scenario)
4	Basic Elements of C++ (Become familiar with the basic components of C++ program including functions, special symbols, and identifiers.)with
5	Input/output Statements (Learn what stream is and examine input and output streams
6	Control Structures-1(Selection) (one way selection and tow way selection)
7	Control Structure-1 if……else if.(Multiple way selection)
8	Mid Term Exam
9	Control Structures (Switch + break and continue statements)
10	Control Structure-2 (Repetition…….while loop
11	Second Evaluation: 10% Marks (Short Quiz/ Homework/ Presentation) + Self Evaluation II
12	Control Structure-2 (Repetition…….for and do while loop)
13	Functions General Concepts (Predefined Functions and User Defined Functions)
14	User Defined functions (Value returning functions)
15	User Defined functions (Void Functions)
16	Final Exam

Subject: Introduction to Programming 2 - CS201

Class & Semester: Year 1st , Semester 2nd			
Credits: 4 Credits **Pre-requisites: CS101** **Category:** Basic **Lecture hours :** 2 Joint-hours every week 90 minutes **LAB hours :** 4 Joint-hours every week 180 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 using Turbo++	Robert Lafore	
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.

Detailed Course Outline:

Week No.	Contents
1	Enumeration data type Name space mechanism
2	One dimensional array
3	Tow dimensional array
4	Searching an array
5	Sorting an array Victor type
6	Record (Struct)
7	Class and data abstraction part -1
8	Mid Term Exam
9	Class and data abstraction part-2
10	Inheritance and composition
11	Pointer Part-1
12	Pointer Part-2
13	Overloading (operator overloading)
14	Overloading (Function overloading + template)
15	Exceptional Handling
16	Final Exam

Subject: Data Communication – CS206

Class & Semester	**1st** year, **2nd** semester		
Credits: 3 credits Pre-requisites: 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	Data Communication,	William Stallings	Pearson, Eight Edition, 2007
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Networks,	Andrew S. Tanenbaum	Pearson, Fifth Edition, 2011
2	Computer Networking: A top down Approach,	Kurose and Ross	Pearson, sixth edition, 2013

Course Description:

This course is designed to give the students an overview about concept of communication, frequency, signals, encoding, and communication media in the Physical Layer. This course also gives an overview of some concepts from Data Link layer such as circuit and packet switched communication, VLANs and trunks and introduction to concepts of packet switched and circuit switched networks. This course is a prerequisite for the Network Fundamentals course in the next semester.

Course Objectives:

The main idea behind designing this course is to familiarize computer network students about communications, signals, frequencies, communication media and the structures of a circuit switched computer network. This course is a base course for most of other courses in next semesters.

Learning Outcomes:

After successful completion of this course the students will understand the basics of communications and also they will distinguish between packet and circuit switched networks.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Introduction to data, message, protocol, standards, Layers, Topologies and Communications
3	Types of links, frequency, waves, Time domain, Frequency domain, Analog, digital, Channels and their capacities, bandwidth and data rates
4	Guided media (Coaxial, Twisted pair, fiber, attenuation, etc)
5	Unguided media (Wireless media, wireless propagation, line of sight, delay, noise)
6	Encoding, frequency division multiplexing, time division multiplexing
7	Synchronous and asynchronous transmission and error detection
8	Midterm exam
9	Link Layer, flow control, Error control, Ethernet, Tokin ring
10	Circuit switched communication
11	PSTN, ATM, Frame Relay
12	Concept of packet switched networks
13	Switching and Forwarding (Bridges and LAN switches)
14	Concept of LAN, MAN, WAN
15	VLANs and Trucks
16	Final Exam

Subject: Digital Logic and Design - CS207

Class & Semester: Year 1st, 2nd Semester			
Credits: 4 **Lecture hours:** 3 Joint-hours every week 135 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/Project		10
4	Final exam		60
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Digital Design With an Introduction to the Verilog HDL	M.Moris Mano & Michael D. Ciletti	5th Edition

Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Organization, Design, and Architecture	Sajjan G. Shiva	4th edition
2	Fundamentals of Logic Design	Charles H. Roth, Jr. & Larry L. Kinney	6th Edition

Course Description:

The course introduces the fundamentals of logic design and digital logic. This course covers digital gates, combinational and sequential logic circuits and registers.

Couse Objectives:

The objective of the course is to provide a knowledge and understanding of the digital devices and also prepare students with the tools to design and create digital circuits.

Learning Outcomes:

By successful completion of the course, the students will be able to design and create both combinational and sequential digital devices. In addition, they understand Boolean algebra, Number systems and different computer codes.

Detailed Course Outline:

Week No.	Topics
1	An overview and number systems
2	Boolean Algebra
3	Boolean Algebra (continued)
4	Application of Boolean Algebra
5	Design of binary Adders and Subtractor
6	Incompletely Specified Functions
7	Boolean Function Minimization using Karnaugh map
8	**Mid Term Exam**
9	Karnaugh Map 3- Variable & 4 Variable
10	Decoders and Encoders
11	Multiplexer and De-multiplexer
12	Application of S-R Latch
13	Flip-Flops
14	counter and Digital Clock
15	Shift Registers
15	**Course Review**
16	**Final Exam**

List of Practical's/Labs and Exercises:

Practical No	Activity
1	Analyzing OR and AND gates
2	Analyzing Inverters and NAND gates
3	Analyzing NOR and Exclusive-OR gates
4	Design of the Full Adder Circuit using Karnaugh maps
5	Design of the Square taking circuit using Karnaugh maps
6	Circuit design with Karnaugh maps
7	TRI-STATE BUFFER
8	RS FLIP FLOP EXPERIMNET
10	RS FLIP FLOP EXPERIMNET(continued)

Subject: Object Oriented Programming – CS301

Class & Semester: 2nd year , 3rd Semester			
Credits: 3 Credits **Category:** Basic **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: 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: Database Concepts – CS303

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: 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: Computer Networks – CS402

Class & Semester	2nd year, 4th semester		
Credits: 3 credits Pre-requisites: CS302 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 gives an insight understanding about computer networks in high level. This course is in sequence of the previous course CS302. In this course, the Internet backbone protocol (BGP), IPv6, IP multicasting and QoS, traffic engineering, MPLS, and VoIP systems are the main subjects.

Course Objectives:

The main idea behind designing this course is to familiarize students how different ISPs deal with each other using BGP protocol, how VoIP applications work, how to optimize network links with traffic engineering and etc.

Learning Outcomes:

After successful completion of this course the students will understand the core of the Internet and its complexity, IP version 6, how a VoIP application such as Skype operates. Students will know about overlay networks and peer-to-peer applications.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Advanced architectures of the Internet
3	Border Gateway Protocol (BGP)
4	Border Gateway Protocol (BGP)
5	IPv6

6	IPv6
7	Peer-to-peer and overlay networks
8	Midterm Exam
9	IP Multicast and QoS
10	MPLS concept
11	MPLS based applications
12	VoIP
13	Network Management – the technical aspects
14	Network Management – the technical aspects
15	Traffic Engineering
16	Final Exam

Subject: Web Development – 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)

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: Advanced Database - CS405

Class & Semester: Year 3, 5th Semester			
Credits: 3 Credits **Pre-Requisites: TE2408** **Lecture hours:** 2 lecture-hours every week 90 minutes **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/ Homeworks/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	Thomas Connolly Carolyn Begg	Pearson Inc. , 6th Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Data Modeling and Relational Database Design	Jan Speelpenning, Patrice Daux, Jeff Gallus	Avril Price-Budgen, Fiona Simpson, Don Griffin

Course Description:

This course is expected to enhance student's knowledge of Database Management System (DBMS) and skills in designing and developing simple database systems.

Course Objectives:

The objective of this course are:

- To expose students to the fundamental concept of Database Management System (DBMS)
- To develop the basic skills in designing and developing Database Systems.

Learning Outcomes:

Upon completion of this course students should be able to:

- Demonstrate knowledge and understanding of basic concepts of database, structured query language (SQL), in particular Data Definition Language (DDL) and Data Manipulation Language (DML).
- Apply and use DBMS tools to design using ER modeling and normalization techniques.
- Work as a team to collect requirements, to analyze and design, to develop a database, to write report and to demonstrate the output through collective presentation.

Detailed Course Outline:

Week	Contents
1	What is Distributed Database System?
	Distributed Data Processing
	Advantages of data DDBS
2	Introduction to SQL using SQL SERVER
	Data Retrieval Language (Select Statement)
	(Select, From, where, order by clauses)
3	Introduction to Built-in Functions
	Basics single row and Group row Functions
	Group by clause
4	Introduction to Joining & its Types
	Data Manipulation Language
	Insert, Delete, Update Statements
5	DDL.
6	Characterization of Query Processors
7	Layers of Query processing
8	Mid Tern Exam
9	Fragmentation
	Reasons for Fragmentation
	Types of Fragmentation
10	Parallel DBMSs
	Database Servers
	Centralized Database Systems
11	Properties of Transactions
	Concurrency control Techniques
12	Locking Methods
	Dead Lock
	Timestamp Method
13	Recovery
	Causes of Failure
	Local Recovery Protocols
	Undo/Redo
	Undo/No-Redo
	Distributed Recovery Protocols
	Distributed Two Phase Commit
14	Integrity Constraints

	Securities Issues in Distributed Databases
	Identification & Authorization
	Distribution of Authorization
15	Encryption
	Global view Mechanism
	Data ware Housing introduction
	World Wide Web introduction
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: Wireless Networks – CS505

Class & Semester: 3rd year , 6th Semester			
Credits: 3 Credits **Pre-requisites: TE3501** **Hours:** 2 Joint-hours every week 90 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	Wireless communication	T.S. Rappaport	2nd Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Communication & Networking	Beluoz A. Forouzan	4th Edition
2	Wireless Communications and Networks	William Stallings	2st Edition

Course Description:

The course will introduce the basics of wireless communication, the evolution of modern wireless networks. The course will develop concepts of the emerging wireless networks: Wireless LAN, Wireless Mesh Networks, Wireless Personal Area Networks, Wireless Sensor Networks, WiMAX. The concepts will be studied in a practical way using real wireless devices and virtual software tools to model simple systems.

Couse Objectives:

The aim of this course is to build the foundation for wireless networks by presenting the challenges at multiple protocol layers.
The course presents the challenges of wireless networking at multiple protocol layers and covers the protocols proposed to handle these challenges while considering additional constraints.

Learning Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

- Understand the basics of wireless communication.
- Have adequate knowledge about the evolution of wireless systems.
- Understand the wireless local area network
- Able to carry research in emerging wireless networks

Detailed Course Outline:

Week No.	Topics
1	Introduction to Wireless communication, Benefits and Limitation
2	Roles Organizations Play Within the WLAN Industry
3	Wireless Transmission, Signal Encoding and Modulation, Categories of Noise, Attenuation and other Impairments
4	WLAN Radio Frequency Principles
5	Multiplexing, Transmission Mediums, Propagation Modes, Multipath Propagation, Types of Fading
6	Evolution of Wireless Networks + WLAN Components
7	Wireless LAN/IEEE 802.11 (Overview, IEEE 802.11 Protocols, Architecture, Services, MAC Protocols, CSMA/CA Algorithm) + Modulation
8	**Mid Term Exam**
9	Problems with DCF, RTC / CTS Protocol, PCF, MAC Frames, Physical Media in Original IEEE 802.11
10	WLAN Antennas
11	Mobile Ad Hoc Networks + Introduction to Wireless Mesh Networks
12	MAC Layer in WMN, Network Layer in WMN, QoS Support at Each Layer, WMN Standards
13	Introduction to WPAN, Bluetooth introduction, Technical Features, Access Technique, Bluetooth Topology/Scenario, Specifications and Architecture, Core Protocols, Packet Format, Link Connections and Flow Specification Parameters
14	WiMAX/IEEE 802.16 (Basics and Overview, Forum, IEEE 802.16 Evolution and Standard, Comparison 802.11 and 802.16,Network Architecture, OFDM, OFDMA, Physical Layer Features, MAC Layer)
15	Security in Wireless Networks
16	**Final Exam**

Subject: **System Administration and Maintenance – CS506**

Class & Semester: Year 3rd , 6th Semester			
Credits: 3 **Pre-Requisites: Computer Networks (TE3501)** **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	Introducing Windows Server 2016	John McCabe with the Windows Server team	Copyright © 2016 Microsoft Press
Recommended Books			
S. No	Book Name	Author(s) Name	Publisher Name & Edition
1	Windows Server 2016 Cook Book	Jordan Krause	Third Edition

Course Description:

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 considered. Brief outline of the course is explained in the course outline below which will be covered during semester, but the course is not only limited to this outline, if needed, the outline can be further extended or squeezed.

Couse Objectives:

The course will train students on how to manage and support a network infrastructure that is based on Windows environment; 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 and monitor the network effectively.

Detailed Course Outline:

Week No.	Topics
1	Introduction to Microsoft Windows Server
2	Learning the Interface and basic tasks

3	User Management
4	Directory Structure
5	File and Directory Permissions
6	DNS and DHCP Servers, Domain Controllers, OU
7	Windows Firewalls, RDP, Multi Homing, Pathping command, NIC Teaming, Joining domain via PowerShell
8	IIS Services
9	Mid Term Exam
10	Remote Access, Direct Access, VPN, Remote Desktop Services
11	RAID concept
12	Logical volume manager, Backup services
13	Server virtualization and performance analysis
14	Network management and monitoring, Group Policy
15	Course Review
16	Final Exam

Routing and Switching Lab-CS513

Class & Semester	Third year, fifth semester		
Credits: 2 credits Pre-requisites: NON Lecture hours: 4 hours lab sessions			
EVALUATION			
S. No	**Quizzes and exams**		**Mark distribution**
1	In-class activities		20
2	Mid-term evaluation		20
3	Assignments		70
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	LAB Manual Provided by Lecturer		
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1			

Course Description:

This course is designed to help student to realize their basic network knowledge in practice. This course will include basic to intermediate level of configuration. The requirement for effective implementation of this course is to provide sets of hardware devices like routers, switches and security devices like firewalls. The focused will be on Cisco devices but other vendors devices will be a good alternative.

Objectives:

To train students with solid practical skills in networking.

Learning Outcomes:

On successful completion of this course students should be able to

- Will gain solid skill of implementing basic configuration of network concepts
- Will gain experience on using hardware, installing, upgrading, versions and licensing
- Will gain practical skill to choose appropriate hardware and software

Week No	Content
1	Course introduction and introducing devices and tools
2	Standard Cisco IOS configuration
3	Remote access configuration of IOS on devices
4	Virtual Private Network (VLAN) configuration
5	STP configuration with its special versions
6	Basic Routing Static Route, Floating Static Route, Static Default Route
7	Configuring Routing Information Protocol (RIP)
8	EIGRP configuration

9	More on EIGRP configuration like Configuring EIGRP Split Horizon, EIGRP Stub Area Networks, EIGRP Timers, EIGRP Maximum Paths, EIGRP Passive Interface, EIGRP Route Summarization and EIGRP Default Route Propagation
10	OSPF Basic configuration
11	More on OSPF Configuring OSPF Network Types, OSPF Static Neighbors, Multi-Area OSPF, The OSPF Router-ID, OSPF Timers, Per Interface OSPF, OSPF Stub Areas, Configuring OSPF Interface Cost, Configuring OSPF Auto Cost Reference Bandwidth, Configuring OSPF Passive Interface, Configuring OSPF Maximum Paths, Configuring OSPF Route Summarization and Configuring OSPF Default Route Propagation
12	Static Route Redistribution, Mutual OSPF and RIP Redistribution, Configuring, Mutual OSPF and EIGRP Redistribution, Mutual EIGRP and RIP Redistribution
13	Network Address Translation (NAT) and Network Address Translation (NAT) Configuring the IOS DHCP Server Configuring an IOS DHCP Server IP Exclusion Range Configuring an IP DHCP Helper Address
14	Configuring the IOS NTP Client, Configuring the IOS NTP Server and Configuring IOS DNS Name Servers
15	The Basics of Internet Protocol Version 6 (IPv6), IPv6 Interface Addressing, IPv6 Static Routing, Basic IPv6 RIPng, Basic IPv6 OSPFv3
16	Final 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: **Unix-based Operating Systems – CS602**

Class & Semester	**3rd** year, 6th semester		
Credits: 2 credits Pre-requisites: Lecture hours: 1 Lecture and 1 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	Unix and Shell Programming	B.M Harvani	Oxford, 1stEdition 2013
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Shell Programming in Unix and Linux	Stephen G. Kochan	Developer's Library, 4th Edition 2015
2	The Linux Command Line	William Shotts	William E. Shotts 2016

Course Description:

In this course, students will become familiar with the basic principles of Unix and Linux Operating Systems. The focus of the course is on the fundamentals of using open source operating systems such as Linux distributions learning and using their applications, and understanding the basic roles and responsibilities of open source operating systems.

Course Objectives:

To give students the idea of using open source operating systems as an alternative to closed source systems. To get students familiar with functionalities and services provided by Linux operating systems.

Learning Outcomes:

After completion of this course, Students should get an idea about how to use and implement Linux operating systems and their services in different areas. They will be able to write shell scripts, configure different network services using Linux.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	The Linux Environment: Command Line and basic command
3	The Linux Environment: Command Line and Advanced commands
4	Linux Systems utilities
5	Using different editors
6	Processes in Linux and I/O
7	Introduction to Shell Scripting
8	Mid Term Exam
9	Advanced Shell Scripting
10	Networking Basics with Linux
11	Anonymous and Named Pipes
12	Advanced Networking with Linux (DNS, DHCP, etc.)
13	Linux as Firewall (Iptables, etc)
14	Linux as Firewall (Iptables, etc)
15	Routing with Linux
16	Final 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: Advanced Java Programming – CS604

Class & Semester third year, sixth semester			
Credits: 3 credits Pre-requisites: NON 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: Advanced Networks – CS607

Class & Semester	3rd year, 6th semester		
Credits: 3 credits Pre-requisites: 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	Network Function Virtualization with a touch of SDN	Rajendra Chayapath	Addison Wisely, First Edition, 2017
2	Software Defined Network: A comprehensive approaches	Paul & Chuck Black	Pearson, First Edition, 2014

Course Description:

This course gives an insight understanding about computer networks and programmability of computer networks in high level. This course covers latest technologies and advancements in the field of computer networks, such as Software Defined Networking (SDN), Network Functions Virtualization (NFV), Internet of Things (IoT) and Advanced VPNs such as The Onion Router (TOR) network, etc.

Course Objectives:

The main idea behind designing this course is to introduce the latest and complex network technologies of computer networks, these technologies are highly used in the market.

Learning Outcomes:

After successful completion of this course the students will understand how much computer networks are tunable and programmable, how much Internet proxies are important in keeping communication hidden, and how much the Internet is scalable.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	VPN and Mobile IP: VPN proxies, ToR network, IP mobility and routing
3	Architectures of Social networks: An overview
4	IP televisions
5	Internet of things (IoT)
6	Internet of things (IoT)
7	Introduction to Software Defined networking (SDN)
8	Midterm Exam
9	Network Programmability
10	SDN controllers
11	Data Centers and SDN Applications
12	Building an SDN framework
13	Building an SDN framework
14	OpenFlow and SDN open source
15	Network Function virtualization (NFV)
16	Final Exam

Subject: ICT for Development– CS610

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	Implementing and Managing eGovernment	Heeks	
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Information and Communication Technology for Development	Unwin, T	Cambridge University Press
2	ICTs for Development in Ethiopia – A Case of the SchoolNet Project - , A dissertation submitted to the University of Manchester for the degree of MSc in ICT for Development	Takeuchi, T	2008

Course Description:

The objective of this module is to understand the opportunities and challenges of utilization of Information and Communication Technology (ICT) for achieving sustainable development in the developing countries, particular Afghanistan through recognizing and analyzing what ICT4D projects are like with using relevant conceptual frameworks and/or models.

Couse Objectives and Outcomes:

Students attending this course shall learn following topic:

- To be able to explain the overview of ICT4D and the worldwide trend of ICT4D attempts
- To acquire skills and knowledge about conceptual frameworks and models to analyze

Success and failure factors of ICT4D projects from socio-technical point of view.

- To understand relevant point of view to plan sustainable ICT4D projects

Detailed Course Outline:

Week No.	Topics
1	Introduction to Course
2	Overview of ICT4D
3	Success and Failure factors of ICT4D Project
4	Information Provision and Development Impact 1
5	Information Provision and Development Impact 2
6	ICT4D Project and Design-Reality Gap
7	Approach for ICT4D Project
8	Success factors for ICT4D
9	**Mid Term Exam**
10	Assignment (Group Presentation)
11	Project Design for ICT4D Project
12	Evaluation of ICT4D Project
13	Practice to analyze ICT4D Projects and Approach for Research
14	Trend of ICT4D
15	Presentation and Course Overview
16	**Final Exam**

Subject: Mobile Application Development – CS702

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: Diploma Project Guide – CS723

Class & Semester	Fourth year, seventh 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

Subject: **Transmission Networks – CS709**

Class & Semester	**3rd** year, 6th semester		
Credits: 3 credits Pre-requisites: Lecture hours: 2 Lecture 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	Fiber Optic Communication: Fundamentals and Applications	Shiva Kumar	Willey, 1stEdition 2013
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Cabling: The complete guide to Copper and Fiber Optic networking	Andrew Oliviero	Sybex, 5th Edition 2014
2	Fiber Optic Installers	Bill Woodward	Sybex, 2015

Course Description:

This course focuses on Fiber optics network as transmission network. This course covers the basics and important parts of the fiber optic systems, from theoretical point, fiber optic structures, transmissions, modes, installation method, splicing, Backbone, regional and metro fiber network designing, etc.

Course Objectives:

To give students the insight into fiber optic networking. To give the students the knowledge of designing, managing and maintaining fiber optic networks.

Learning Outcomes:

After completion of this course, students will know how to manage, design and trouble shoot a fiber network.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Electromagnetic and Optics
3	Fiber Optic Structures
4	Fiber-Optic Cable Connectors
5	Fiber Splicing
6	Optical Modulator and Modulating schemes
7	Fiber-Optic Light Sources and Transmitters
8	Midterm Exam
9	Optical Receivers and Amplifiers
10	Optical network topologies
11	Metro Core optical networks
12	Backbone optical networks
13	Metro access optical networks
14	Fiber-Optic System Design Considerations
15	Passive Optical Networks
16	Final Exam

Subject: **Open Source System Administration – CS719**

Class & Semester	4th year, 7th semester		
Credits: 2 credits Pre-requisites: CS602 Lecture hours: 1 Lecture and 1 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	Linux System Administration Handbook	Evi Nemeth	Prentice Hall, Second Edition 2007
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Shell Programming in Unix and Linux	Stephen G. Kochan	Developer's Library, 4th Edition 2015
2	Ubuntu Server Essentials	Abdelmonam Kouka	Packt Publishing, First Edition, 2015

Course Description:

In this course, students will become familiar with system administration using open source packages and operating systems. This course is like the course CS506, which is Microsoft based. This courses focuses on how we can provided network and application service using Linux as operating system and other open sources packages as services.

Course Objectives:

To give students the idea of using open source operating systems as an alternative to closed source systems. To get students familiar with functionalities and services provided by Linux operating systems.

Learning Outcomes:

After completion of this course, Students should get an idea about how to use and implement Linux operating systems and their services in different areas. They will be able to write shell scripts, configure different network services using Linux.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Linux Server installation, adding new users

3	Software Configuration and Management
4	Lightweight Directory Access Protocol (LDAP)
5	Lightweight Directory Access Protocol (LDAP)
6	Samba Services (Printing, AD, etc)
7	Samba Services (Printing, AD, etc)
8	Mid Term Exam
9	Web hosting and Internet services
10	Building a Linux Firewall
11	Building VPN Server
12	Single Sign-on with Samba for Mixed Linux/Windows LAN
13	Single Sign-on with Samba for Mixed Linux/Windows LAN
14	Mail Servers
15	LAMP Architecture
16	Final Exam

Subject: **Cellular Networks – CS717**

Class & Semester	4th year, 7th semester		
Credits: 3 credits Pre-requisites: CS505 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	Mobile Communications	Joshen Schiller	Addison Wesley, 2nd Edition, 2003
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	From GSM to LTE: An introduction to mobile networks and mobile broadband	Martin Sauer	Willey, Second Edition, 2014
2	Mobile Messaging, Technologies and Services	Gwenael Le Bodic	Willey, second edition, 2005

Course Description:

This course gives an insight understanding about different mobile networks. It presents the evolution of mobile network from 2G up to 5G. In this course, the Global System for Mobile Communication (GSM) its services and amendments, Universal Telecommunications System (UMTS), High Speed Packet Access (HSPA), handover mechanism in these systems are taught. Location based services, messaging systems, and the Long Term Evolution are also included in this course.

Course Objectives:

The main idea behind designing this course is to familiarize students about mobile communications system, mobile data networks. Understanding the difference between mobile network technologies and pervasiveness of mobile technologies in the community are another objectives of this course.

Learning Outcomes:

After successful completion of this course the students will understand the basics of mobile communications and also they will distinguish between different mobile technologies.

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	GSM Network Architectures
3	GSM Network Architectures
4	3G Mobile Data Networks (HSPA, UMTS, EDGE)
5	3G Mobile Data Networks (HSPA, UMTS, EDGE)
6	Handover in Mobile Networks
7	Handover in Mobile Networks
8	Midterm Exam
9	Mobile Messaging Services
10	LTE network
11	LTE Inter-operation with UMTS and GSM
12	Location based services
13	Location based services
14	MMS and IMS
15	Introduction of 5G mobile networks
16	Final Exam

Subject: Distributed Network Systems - CS803

Class & Semester Fourth year, eighth semester			
Credits: 4 credits Lecture hours: 3 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	Distributed Network Systems from Concept to Implementations	Weijia Jia, Wanlei Zhou	Springer
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Distributed Systems Concepts and Design	George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair	5th

Course Description:

This course is the last subject of the last semester for attendees in which the modern concepts of distributed networks with basic distributed algorithms will be taught to them. This course will combine most of the basic concepts that attendees have learned in previous semesters and lead to utilize them in a real practice. The look to this course is more like a capstone subject to let students bring their all knowledge together to understand their usage in a real world technologies.

Course Objectives:

This course will focus on concept, models, benefits and challenges of distributed network systems. Here it will also be covered in more details to touch different components of a distributed network systems. Depends on orientation that has been given to the class at the beginning. Lecturer will plan to which type of distributed network systems directs the course.

Learning Outcomes:

- They will understand what is distribution and distributed computing
- They will learn the purpose and benefits of distribution
- They will learn about challenges and limitations of distributed network systems
- They will get familiar with large and also modern computing systems
- They will learn types of distributed computing systems
- They will learn different models and architecture of distributed network systems.
- They will learn how distribution can happen in different layers of technologies.
- They will learn simple implementation of distributed network systems

Detailed Course Outline:

Week No.	Topics
1	Introduction and definition
2	Basic communication concepts
3	Distributed network system architecture
4	Introduction to a common network application like, email system.
5	Socket / socket based communication plus implementation
6	Basic distributed algorithms plus implementation
7	Multithreading concept
8	Mid Term Exam
9	Multithreading application over network
10	Synchronization and thread management
11	Group communication plus reliability and replication techniques
12	Inter-process Communication (RPC)
13	RMI Implementation
14	Middleware concept
15	Evaluation and summary
16	Final Exam

ELECTIVE SUBJECTS

Subject: Introduction to Specialty – CS104

Class & Semester: Year 1, 1st Semester			
Credits: 2 Credits **Category:** Elective 1 **Lecture hours :** 2 hour-session in a week 90 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**
1	**Curriculum of Telecommunication Engineering**		Silk Route Institute of Higher Education-Edition 1

Course Description:

This course is designed to provide an overview of the degree program to the students. The overall introduction of the Telecommunication Engineering is provided and the specializations, outcomes and future outcomes are explained to the students. It is offered in the first semester so that the students are motivated to work hard in the coming semesters to be a successful graduate and know about the market value of the course.

Course Objectives:

Upon successful completion of the course, the student should be able to:

- Understand the course syllabus
- Understand the reason of subjects offered in each semester
- Understand the market value of this degree
- Know the importance of each specialization courses

Detailed Course Outline:

Week	Contents
1	Introduction the Credit System and method of calculating CGPA
2	Orientation Module of Telecom Engineering and its scope in commercial market
3	Programs Education Outcomes (PEO)
4	Program Outcomes (PO) of Telecommunication
5	Overview of Semester 1 Subjects and their learning outcomes
6	Overview of Semester 2 Subjects and their learning outcomes
7	Overview of Semester 3 Subjects and their learning outcomes
8	Mid Term Exam
9	Overview of Semester 4 Subjects and their learning outcomes
10	Overview of Semester 5 Subjects and their learning outcomes
11	Overview of Semester 6 Subjects and their learning outcomes
12	Overview of Semester 7 Subjects and their learning outcomes
13	Overview of Semester 7 Specialization Subjects and their learning outcomes
14	Overview of Semester 8 Subjects and their learning outcomes
15	Overview of Semester 8 Specialization Subjects and their learning outcomes
16	Final Term Exam

Subject: **Sport – GE101**

Subject: **Usage of Electronic Devices – CS211**

Class & Semester: 1st year , 2nd Semester			
Credits: 2 Credits **Category: Elective** **Hours:** 1 hour every week 45 minutes **Lab/activity 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	**Electronic Instrumentation**	**H S Kalsi (2004)**	**Tata McGraw-Hill Education**
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Electronic Instrumentation and Measurements	David A Bell	Oxford University Press (2006)
2	Measurement and Instrumentation Principles	Alan S Morris	Butterworth-Heinmann
3	**Electrical Measurements and Measuring Instruments**	**Golding and Widdis**	**Reem Publications (2013)**

Course Description:

The course describes working mechanisms of electronic instruments and teaches about evaluating performance parameters for the same. Different kinds of electronic sensors and their integration into an electronic measurement system will be dealt in detail apart from judging their performance in terms of precision, accuracy and stability etc. This course will help a student to work with an electronic instrument with prior knowledge of its internal working mechanisms to get maximum output from the devices.

Couse Objectives:

The objectives of this course are to make the students:

- To understand working mechanisms for various kinds of electronic instruments
- To learn about various parameters which affect measurements using electronic devices

Learning Outcomes:

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

- Explain the working mechanisms of electronic devices in detail
- Integrate electronic devices to fabricate an instrument for taking measurements
- Analyze and improve the performance of electronic instruments

Detailed Course Outline:

Week No.	Contents
1	Introduction and course overview
2	**Measurement characteristics:** Digital and Analog measurements-Discretization-error analysis-Accuracy-precision-range-units-dimensions-standards-linearity-sensitivity-threshold-resolution
3	**Characteristics of instruments:** static and dynamic instruments-order of instrument measurement-limitations
4	Galvanometers: Principle-Operation-Damping-Calibration-Shunts-Ballistic type
5	Ammeters: types-accuracy-range-Using thermocouple as ammeter-multi range ammeter-clamp on type
6	**Voltmeters:** types-accuracy-range-multi range voltmeter, **Transformer** and their applications in the extension of instrument range, AC and DC Potentiometers
7	**AC/DC Measurements :**Different methods of measuring low, medium and high resistances, measurement of inductance & capacitance with the help of AC Bridges- Wheatstone,
8	**Mid Term Exam**
9	**AC/DC Measurements :**Kelvin, Maxwell, Hay's, Anderson, Owen, Wien bridges, Wagner earthlings device, Frequency measurements
10	Block diagram, working, basic controls, Channels, Oscilloscope probes, Oscilloscope amplifiers, display of electrical signals, measurement of phase difference, measurement of frequency
11	Multiple trace, high frequency oscilloscope, sampling oscilloscope, probe loading and measurement effects, limitation,
12	Digital storage oscilloscope, signal generators: operation of oscillator, frequency stability, function generators, wave shaping, Differential and Operational amplifiers and their use as signal amplifiers
13	Digital measurements: Quantization and sampling frequency, ADC, DAC, Frequency-to-voltage converters, resolution, accuracy, errors
14	**Transducers:** classification, thermal, strain gauges, thermometers, inductive type, capacitive type, piezoelectric type, photoelectric, hall-effect based
15	**Course Review**
16	**Final Exam**

Subject: Introduction to Internet Services – CS210

Class & Semester: Year 1, 2nd Semester			
Credits: 2 Credits **Category:** Elective 2 **Lecture hours :** 2 hour-session in a week 90 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**
1	***The Big Basics Book of The Internet***	**Joseph W. Habraken**	Que Pub; 2 Sub edition (1997)

Course Description:

Introductory course exploring the fundamentals of Internet communications with an emphasis on the World Wide Web. Students gain understanding of the Internet's underlying technologies and learn how to utilize them as contributing members of the Web community. Students become proficient with creating and publishing Web pages using HTML and CSS. No prior knowledge or experience is assumed. This course presents to the student with an introduction to the Internet and its services, applications and tools. World Wide Web and its facilities, applications and tools. Topics include Internet history, a survey of Internet-based facilities and applications (e.g., e-mail, web browsers, file transfer utilities, list servers, etc), and Web-based research and information resources.

Course Objectives:

Upon successful completion of the course, the student should be able to:

- Define terms related to the Internet.
- Describe how the Internet is changing the world.
- Understand how computers are connected to the Internet.
- Demonstrate the ability to use the World Wide Web.
- Understand and apply Internet Etiquette.
- Demonstrate an understanding of and the ability to use electronic mail.
- Understand the principles of Internet services such as Listserv Mailing Lists, Usenet Newsgroups, and Instant Messaging.
- Find information on the Internet.
- Understand and use common types of files found on the internet.
- Demonstrate the ability to download a variety of resources from the internet.
- Understand methods for citing Internet resources.
- Understand how Web pages are designed and created.
- Demonstrate an ability to create basic Web pages with HTML.
- Understand societal issues and emerging technologies.

Homework and class activity details

Throughout the semester the students are expected to learn the above mentioned course objectives and show their obtained skills in the form of assignments and group works. As a preparation towards the lecture, the students are expected to read the reading material ahead of time.

Detailed Course Outline:

Week	Contents
1	Orientation Module
2	Introduction to the Internet and the World Wide Web
3	Browser Basics
4	Basic Communications on the Internet: E-Mail
5	Searching the Web
6	Information Resources on the Web
7	Downloading and Storing Data
8	Mid Term Exam
9	Real-Time Communication on the Internet
10	Mass Communication on the Internet
11	Google Drive and other cloud storages
12	Torent Files and their legal status
13	Parental Control tools
14	Securing and Enhancing Your Use of the Internet
15	Electronic Commerce
16	Final Term Exam

Subject: Sport – GE201

Subject: Automata Theory – CS312

Class & Semester	Second year, third semester		
Credits: 3 credits Category: Basic Lecture hours: 3 hours - 90 Minutes Practical hours: 2 hours- 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	Introduction to Computer Theory	Daniel I.A. Cohen	Wiley, 2nd Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Introduction to Languages and theory of Computation	J.C. Martin	International Thomson Computer Press

Course Description:

This is an introductory course on Theory of Automata. Students are introduced to the concept of Formal Language and Automata. Formal Languages cover recursive definitions of languages, regular grammar, regular expression, context free grammar and language.

Course Objectives:

In Automata they learn about finite automata (deterministic; non-deterministic), transition graphs and pushdown automata (deterministic; non-deterministic). They also learn about fundamental concept of Moore and Mealy machines and Turing machines.

Learning Outcomes:

Upon successful completion of this course students should be able to:

- Explain different methods for defining languages
- Discuss what Finite Automata is
- Differentiate between Regular Languages and NonRegular Languages
- Describe Context-free languages and context-free grammars, parse trees, derivations and ambiguity; Basic concepts of pushdown automata
- Explain basic definitions and relation to the notion of an algorithm or program

Detailed Course Outline:

Week No.	Topics
1	Introduction to the course
2	Kleene Star Closure Plus operation Recursive definition of languages Examples
3	Regular Expressions(RE) Defining languages by RE Examples
4	Equivalent regular expressions; sum, product and closure of regular expressions Regular languages
5	Introduction to finite automaton (FA) Definition of FA Transition table (TT) Transition diagram (TD)
6	Different notations of transition diagrams Examples More examples on RE, FA, TT, TD
7	FA corresponding to finite languages Transition graphs (TG) Examples of TGs
8	Mid Term Exam
9	Definition of Generalized Transition Graph (GTG)
10	Nondeterminism Kleene's theorem (part I part II, part III) Proof of Kleene's theorem
11	Proof of Kleene's theorem part II (method with different steps). Particular examples of TGs to determine corresponding REs.
12	Kleene's theorem part III (method 1: union of FAs) Kleene's theorem part III (method 2: Concatenation of FAs) Kleene's theorem part III(method 3:Closure of an FA)
13	Moore machine Mealy machine Examples complementing machine Incrementing machine
14	Context Free Grammar Terminals & Non-terminals Productions CFG context Free language Examples Example of trees Polish Notation Examples Ambiguous CFG Example
15	Method to build TG for Regular Grammar. Definition of Chomsky Normal Form (CNF) Definition of PUSH DOWN Automata Example of Non-Deterministic PDA.
16	Final Exam

Subject: System Analysis and Design – CS410

Class & Semester: Year 2, 3rd Semester			
Credits: 3 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			
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 inter-organizational 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: Circuit Theory – CS313

Class & Semester: 3th Semester			
Credits: 2 Credits **Type:** Core **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	**Introductory Circuit Analysis**	**R. L. Boylestad**	Pearson, International Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	**Fundamentals of Electric Circuits**	**Alexander Sadiku**	14th Edition
2	**Alternating Current Circuits**	**Kerchner and Corcoran**	

Course Description:

Electrical Units and Standards , Electrical Networks, Circuit solution - series, parallel, series-parallel networks, Loop and nodal methods, Delta-wye transformation, Circuit Theorem: Superposition theorem. Thevenin's theorem, Norton's theorem. Concept of Dual Networks. Basic principal of generation of Alternating and Direct Current. Introduction to Phasor algebra as applied to A.C circuit analysis. Solution of A.C. circuits: Series, Parallel and Series-Parallel circuit, R-L-C circuits, series and parallel resonance, Applications of Network Theorems to A.C. circuits.

The Magnetic field intensity, flux density, magnetic effect of electric current, Magnetic circuit concepts, BH curves, Characteristics of magnetic materials, magnetic force and its utilization, Hysteresis and eddy current losses, magnetic circuit with A.C. and D.C. excitation.

Couse Objectives:

The subject aims to provide the student with:

- An understanding of basic EE and Magnetic Circuit abstractions on which analysis and design of electrical and magnetic circuits and systems are based.
- The capability to use abstractions to analyse and design simple electric and magnetic circuits.
- Basic understanding of alternating current and Phasor analysis of simple AC circuits.
- Understanding of basic magnetic concepts and circuits.

Learning Outcomes:

This subject develops and applies the fundamentals of electric technology in order to deepen the understanding of electric devices that are part of the technologies that surround us. In order to pass the subject, the student should meet the following requirements:

- Identify the applications and functions of electric in Engineering.
- Recognize basic electric and electronic components and devices used for different electronic functions.
- Be able to use basic techniques for analyzing electric circuits.
- Be able to manage the tools in a basic electric laboratory and use electronic simulation tools.

Detailed Course Outline:

Week No.	Contents
1	Electrical Units and Standards. Electrical Networks
2	Circuit solution - series , parallel networks
3	Delta-wye transformation
4	Series-parallel networks solution
5	Loop and nodal methods
6	Circuit Theorem: Superposition theorem
7	Thevenin's and Norton's theorem
8	**Mid Term Exam**
9	Concept of Dual Networks
10	Basic principal of generation of Alternating and Direct Current
11	Introduction to phasor algebra as applied to A.C circuits
12	Solution of A.C. circuits: Series, Parallel and Series-Parallel circuit
13	R-L-C circuits, series and parallel resonance. Application of Network Theorems to A.C. circuits
14	Magnetic circuit concepts, BH curves, Characteristics of magnetic materials
15	**Course Review**
16	**Final Exam**

Subject: Computer Architectures – CS409

Class & Semester: 4th Semester			
Credits: 3 **Type:** Core **Lecture hours :** 2 Joint-hours every week 90 minutes **Lab hours :** 2 Joint-session every week 90 minutes			
Reference Book			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer Organization and Design The hardware/software interface	David A. Patterson & John L. Hennessy	3rd Edition
2	Computer Organization, Design, and Architecture	Sajjan G. Shiva	4th Edition
3	Computer organization and Architecture designing for performance	William Stallings	8th Edition
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Computer system Architecture	M.Moris Mano	3rd Edition

Course Description:

The subject provides an understanding of the low level operations of the computer as well as the design and organization of the CPU and the computer as a whole. Additionally, it provides an understanding of abstraction layer between the hardware and software of the computer system.

Couse Objectives:

The objective of the course is to understand and design a simple computer system, analyses the performance of the computer system and understand the issues effecting the modern processors.

Learning Outcomes:

- To understand the performance of the computer
- To design/build A Simple Computer
- To know the characteristics and nature of modern day computers
- To understand a computer system's functional components, their characteristics, their performance, and their interactions
- To understand the memory hierarchy of the computer system

Detailed Course Outline:

Week No.	Topics
1	Introduction to Course
2	Computer Abstractions and Technology
3	Lecture3: An overview of A simple computer
4	Register Transfer Language
5	Data Format , instruction Format and instruction set of a simple computer(ASC)
6	Addressing mode of ASC
7	Hardwired Control unit design
8	**Midterm Exam**
9	Combine components of ASC
10	Assessing the performance of computer
11	Designing for performance
12	Computer Memory System Overview
13	cache memory
14	Programmed and interrupt I/O
15	**Course Review**
16	**Final Exam**

Subject: Introduction to Information Systems – CS514

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: Microwave and Satellite Communication – CS721

Class & Semester: Year 4th , 8th Semester			
Credits: 3 **Pre-Requisites: TE2301, TE4703** **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	Satellite Communications	T. pratt, Ch. Bostain, J.Allnut	2nd edition, John Wiley & Sons, 1986
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	Satellite Communications	G.Maral, M. Bousquet	3rd ed., McGraw-Hill, 2001
2	Satellite Communications systems	Keiser G	2nd edition, John Wiley & Sons, 2002.

Course Description:

This course is designed to provide a comprehensive knowledge of Satellite communication to the students. It covers the topics of satellite evaluation and its communication with the base station in the form of radio and electromagnetic waves.

Couse Objectives:

- This is a required course for students at a senior year.
- The goal of the course is to introduce students to the fundamentals of satellite communication.
- To provide them with a sound understanding of how a satellite communication system successfully transfers information from one earth station to another.
- To expose them to examples of applications and tradeoffs that typically occur in engineering system design, and to ask them to apply the knowledge in design problems.
- This course contributes to the educational objectives 1(Fundamental knowledge), 2 (Specialization), 3 (design skills) and 4 (self-learning).

Learning Outcomes:

- How to describe the motion of satellite in the orbit.
- How to compute look angles: Elevation and azimuth.
- How to compute the coverage angle and angle of visibility and consequently determine the coverage area.
- How to relate the coverage area with the beam width of satellite antenna.

- Understand orbital effects in communications system performance.
- To study transponders and earth stations.
- How to calculate the received carrier power at the input of earth station receiver or satellite transponder.
- How to compute the noise power.
- How to calculate the carrier to noise ratio at the input of earth station or satellite transponder.
- How to design both up-link and down link.

Detailed Course Outline:

Week No.	Topics
1	Introduction to Satellite Communication: Historical background, Basic concepts of Satellite Communications, Communication Networks and Services, Comparison of Network Transmission technologies, Orbital and Spacecraft problems, Growth of Satellite communications.
2	Orbits and Launching Methods: Introduction, Kepler's First Law,Kepler's Second Law, Kepler's Third Law, Definitions of Terms for Earth-Orbiting Satellites.
3	Orbital Elements, Apogee and Perigee Heights, Orbit Per turbations, Effects of a non-spherical earth, Atmospheric drag.
4	The Geostationary Orbit: Introduction, Antenna Look Angles, The Polar Mount Antenna, Limits of Visibility, Near Geostationary Orbits, Earth Eclipse of Satellite, Sun Transit Outage, Launching Orbits
5	Radio Wave Propagation: Introduction, Atmospheric Losses, Ionospheric Effects, Rain Attenuation, Other Propagation Impairments
6	Polarization: Introduction, Antenna Polarization, Polarization of Satellite Signals, Cross Polarization, Discrimination, Ionospheric Depolarizaon, Rain Depolarization, Ice Depolarization
7	The Space Segment: Introduction, The Power Supply, Attitude Control, Spinning satellite stabilization, Momentum wheel stabilization, Station Keeping.
8	**Mid Term Exam**
9	Thermal Control, TT&C Subsystem, Transponders, The wideband receiver, The input demultiplexer, The power amplifier, The Antenna Subsyste
10	The Earth Segment: Introduction, Receive-Only Home TV Systems, The outdoor unit, The indoor unit for analog (FM) TV, Master Antenna TV System. Community Antenna TV System, Transmit-Receive Earth Station
11	The Space Link : Introduction, Equivalent Isotropic Radiated Power, Transmission Losses, Free-space transmission, Feeder losses, Antenna misalignment losses, Fixed atmospheric and ionospheric losses, The Link-Power Budget Equation, System Noise, Carrier-to-Noise Ratio, The Uplink, Saturation flux density, Input backoff, Downlink, Output back-off, Combined Uplink and Downlink C/N Ratio
12	Satellite Access: Introduction, Single Access, Preassigned FDMA, DemandAssigned FDMA, Spade System, TDMA, Preassigned TDMA, Demand-assigned TDMA, Satellite-Switched TDMA, CodeDivision Multiple Access
13	Direct Broadcast Satellite Television and Radio: C-Band and Ku-Band Home Satellite TV, Digital DBS TV, DBSTV System Design, DBS-TV Link

	Budget, Error Control in Digital DBS-TV, Master Control Station and Uplink, Installation of DBSTV Antennas, Satellite Radio Broadcasting, Digital Video Broadcast(DVB) Standards, Digital Video Broadcast – Terrestrial (DVB-T)
14	Satellite Mobile and Specialized Services: Introduction, Satellite Mobile Services, VSATs, Radarsat, Global Positioning Satellite System (GPS), Orbcomm, Iridium
15	**Course Review**
16	**Final Exam**

Subject: Modern Technologies – CS722

Class & Semester	Fourth year, seventh semester		
Credits: 4 credits Pre-requisites: CS601 and CS401 Lecture hours: 2 hours lecture			
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			
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**

Course Description:

This course is one of the last subjects for students during their four year of bachelor. This course contains introductions to new technologies and concepts in the area of computer science that they did not studied during their previous semesters.

Course Objectives:

The main goal of this course is to introduce students to new technologies and concepts such as cloud computing, Internet of things, 4G, 5G, virtualization, software defined networks, network function virtualization, and convergent networks.

Learning Outcomes:

- They will understand what is virtualization
- They will learn the purpose and approaches of cloud computing
- They will learn what is convergent networks
- They will learn about network function virtualizations
- They will get familiar with software defined networks
- They will learn about internet of things
- They will learn different generations of communication technologies (2G-5G)

Detailed Course Outline:

Week No.	Topics
1	Introduction and definitions
2	Virtualization
3	Cloud Computing 1: Introduction to Cloud Computing
4	Cloud Computing 2: Infrastructure as a Service
5	Cloud Computing 3: Platform as a Service

6	Convergent Networks
7	Network Function Virtualization
8	Mid Term Exam
9	Software Defined Network
10	Internet of Things
11	2G and 3G
12	Evolved Packet Core (LTE/LTEA)
13	5G 1
14	5G 2
15	Evaluation and summary
16	Final 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 • Content Providers
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

Subject: Creativity Development– CS812

Class & Semester: Year 4rd, 8th 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	The Innovator's DNA: 5 Skills to be Innovative	Jeff Dyer, Hal Gregersen, Clayton M. Christensen	Harvard Business Schook Press
Recommended Books			
S. No	**Book Name**	**Author(s) Name**	**Publisher Name & Edition**
1	This is Service Design Thinking: Basics, Tools, Cases	Mark Sickdorn, Jakob Schneider Wiley	

Course Description:

It is critical to come up with creative solutions to social/business issues. In this course students will learn and practice various methods to encourage creative thinking with real cases and group works.

Couse Objectives and Outcomes:

Students attending this course shall learn following topic:

(1) To understand and practice various creative methodologies, and become able to apply them in real situations.
(2) To understand the characteristics of innovators and become able to practice some of them to be more creative.

Detailed Course Outline:

Week No.	Topics
1	Introduction to Course
2	Innovator's skills #1: Associating/ Observing
3	Innovator's skills #2: Observing
4	I Innovator's skills #3: Questioning
5	Innovator's skills #4: Networking/ Experimenting
6	Innovation Case
7	Service Design: Creating a novel service
8	Final Case#1 Defining innovation themes
9	**Mid Term Exam**
10	Final Case#2 Analysis and Hypothesis building
11	Final Case#3 Designing solutions
12	Final Case #4 Developing presentation materials
13	Final Case#5 Presentation
14	Reflection
15	Course Overview
16	**Final Exam**