

Hope University College

Faculty of Information Science

Department of Information Technology



**Revised Curriculum
Version II**

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1. Introduction

Information Technology is one the BSC Programs of Hope University College which has got accreditation from the Higher Education Relevance and Quality Agency (HERQA) in August 2003 E.C. Due to the very fact that curricula are dynamic by their nature; the first version of the curriculum has been revised in the process of reaccreditation and the updates made have been incorporated in this revised version.

2. Program Rationale

In the current information age, Information Technology (IT) is playing a critical role in the social and economic advancement of developing countries like Ethiopia. There is a great need to adopt Information and Communications Technology (ICT) as stipulated in the development goal of the country in order to deliver quality service, facilitate business processes, and advance socio-economic development. This emphasis, in turn, requires an IT infrastructure, along with well-qualified and trained people, who can play a significant role in the development and operation of such infrastructure. This Bachelor of Science in Information Technology is thus designed to train people in Information Technology.

3. Departmental Vision, Mission and Objectives

3.1 Vision Statement

The vision of the Department of Information Technology of HOPE UNIVERSITY COLLEGE is to prepare professionals in information technology who demonstrate excellence in their knowledge and application of the technology.

3.2 Mission Statement

The mission of the Department of Information Technology of HOPE UNIVERSITY COLLEGE is to deliver high quality education in information technology using state of the art facilities, highly qualified staff and a curriculum that brings about competency to meet the needs of the private and public sectors in information technology.

3.3 Objectives

The objectives of the Department of Information Technology at HOPE UNIVERSITY COLLEGE are to train people with the knowledge and skills in information technology and have them assume professional positions in the field. The training will also help students make useful contributions and have a strong conceptual and practical understanding of information technology thereby enabling them to create and utilize appropriate methods, theories, and techniques to solve business and organizational problems, evaluate and recommend IT solutions and develop know how that enable problem solving in IT.

4. Professional and Program Profiles

4.1 Professional Profile

A graduate from this program is expected to have the following abilities and skills:

4.1.1. Knowledge, Understanding and Practical Skills

A graduate will:

- Use and apply current technical concepts and practices in the core information technologies.
- Analyze, identify and define the IT requirements that must be satisfied to address problems and opportunities faced by organizations and individuals.
- Design effective IT-based solutions and integrate them into the user environment;
- Identify and evaluate current and emerging technologies and assess their applicability to address the user's needs.
- Analyze the impact of technology on an individual, organization and the society.
- Develop an effective IT project plan.
- Analyze, adopt and demonstrate IT best practices, standards and applications.
- Demonstrate problem-solving skills.
- Work with teams to address IT solutions.
- Communicate effectively and efficiently with clients, users and peers both verbally and in writing using appropriate terminology.
- Implement, maintain and manage information technologies and services, web-based systems, services, data and database systems.

4.1.2. Attitudes and Values

The graduates will

- Work in teams in projects of information systems and system development.
- Have good communication skills with whom they interact.
- Exhibit professionalism in all their endeavors.
- Have personal confidence in their professional activities.
- Have high integrity.
- Demonstrate goodwill towards others by putting public interest ahead of their own.

4.2 Program Profile

The program prepares students to become highly skilled in computer technology and its applications in information processing and delivery in various professional fields. Given the importance of the technology in this digital age, the program also trains people to set up their own businesses.

5. Teaching Philosophy and Methodology

5.1 Teaching Philosophy

Based on the mission of HOPE UNIVERSITY COLLEGE and the outcomes of the discussions with relevant stakeholders, the following elements constitute the philosophy of the curriculum:

- Excellence in applying scientific knowledge in a professional setting.
- Continual interaction between the faculty, students and professional learning environments to enable competence.
- Integration of theory and practice to bring about excellent professionals.
- Ongoing contact with the private and public sectors and other stakeholders to develop a curriculum that is relevant, competitive and value-adding.
- The development of competencies as an indispensable outcomes of the curriculum.
- The reinforcement of teaching with coaching to foster holistic student development.

5.2 Teaching Methodology

Competency based education, which is a student-centred methodology, emphasizes theory alongside skills, work-scene interface and personal development. In this interaction, there shall be classroom lectures, laboratory activities, and practicum sessions in the private sector. Students will also engage in presentations and group projects, which reflect actual situations in business or industry.

Competency based education stresses the interrelationship of several learning dimensions in which the students combine knowledge, skills, values and attitude to create effective learning processes and to meet the standards of Hope University College.

The educational program will be characterized by increasing complexity. Knowledge, skills, attitude and competencies will be tested at several levels during all semesters. The following five complexity-dimensions are distinguished:

- Level of self-management of the student
- Level of professional cases to be dealt with
- The level of knowledge (and required analytical skills) to understand a specific subject
- The number of instruments, tools and methods needed to approach the subject

The department acknowledges these dimensions and challenges the students in the course of their professional maturity. Therefore, the curriculum has the integrative elements between theory and practice, between the different disciplines that are taught (a multi-disciplinary approach), and between the constituting parts of a competency. Furthermore, the curriculum has integrative elements between linguistic, calculative, analytic, synthetic, technical and ethical tools to explore available knowledge and develop an intellectual maturity for better judgement, leadership and knowledge ability.

6. Assessment Methods

6.1 Student Assessment

A student's achievement level for a course shall be assessed principally by examinations to gauge content knowledge and by assignments, laboratory tests and projects to assess competency. Ongoing assessment by way of tests shall help in identifying where a student is and to help a student to catch up.

6.1.1. The Grading System

The grading system is a criteria referenced with a five scale assessment ranging from A to F as presented below.

Score	[86-100]	[80-86)	[76-80)	[70-76)	[66-70)	[60-66)	[50-60)	[47-50)	[37-47)	Below 37
Grade	A	A ⁻	B ⁺	B	B ⁻	C ⁺	C	C ⁻	D	F
Value	4.00	3.75	3.50	3.00	2.75	2.50	2.00	1.75	1.00	0.00

6.2 Program Assessment

To guarantee the quality and standard of the program the Department:

- Provides on-the-job training upgrading the academic qualification of the staff as needed.

- Gathers feedback from students, employers and graduates as deemed necessary and uses the feedback to improve the curriculum.
- Has prepared and put in place rules governing delivery and assessment of courses.
- Performs regular evaluation of the program based on the current trends in the field and the country's skilled manpower needs
- Periodically acquires appropriate textbooks/references, laboratory equipment, software applications and so forth.
- Prepares a course syllabus for all courses offered in the department in order to standardize the course content.
- Carries out regular evaluation of the staff

7. Admission Requirements of the Department

A candidate will be eligible for admission if he/she fulfills the minimum admission requirement

- ✓ Set by the Ministry of Education for the year
- ✓ Advance standing
- ✓ Transfer from an accredited higher institution for degree program
- ✓ TVET graduates who are certified by COC agency, have two years of service and entrance examination of the University College

8. Duration of the Study

The duration of the study for the Bachelor of Science in Information Technology is four years for the regular program and five years for extension.

9. Degree Nomenclature

The degree offered after successful completion of the program is called:

- In English – “Degree of Bachelor of Science in Information Technology”
- In Amharic – “ የሳይንስ ባችለር ዲግሪ በኢንፎርሜሽን ቴክኖሎጂ”

10. Graduation Requirements

Graduating students shall be awarded “Bachelor of Science in Information Technology” if they fulfill the following requirements:

- Successful completion of a minimum of 143 credit hours
- An attainment of a minimum Cumulative Grade Point Average of 2.00.
- An attainment of a minimum Cumulative Grade Point Average of 2.00 in the courses of specialization or major area.
- Absence of F or I or NG in one's transcript.

11. Course Coding

All the Information Technology courses start with the prefix **INTE** representing **IN**formation **TE**chnology followed by three digits.

- ✓ The first digit represents the year in which the course is delivered.
- ✓ The middle digit signifies the categorization of courses in the program. The following categories together with their codes are identified to cluster the courses:

0: Basics Courses

1: Programming

2: Database

3: Systems

4: Hardware, Networking and Operating Systems

5: Applications

6: Special

- ✓ The last digit indicates the semester in which the course is offered:
 - An odd last digit shows that the course is offered in the first semester
 - An even last digit shows that the course is offered in the second semester.

Remark:

- ✓ The supportive courses assume their code numbers from the owner departments.
- ✓ The above rule of course coding does not bind general courses.

12. Quality Assurance

The university college shall have a section for Quality Assurance as an internal audit of the academic program. The director of this section shall ensure quality by monitoring and evaluating academic programs and achievements on a regular basis using set benchmarks of academic excellence.

12.1. The internal scheme of performance audit shall enable constant renewal and relevance in the university college. The audit will review the actual outcomes of the content and pedagogy of disciplines by departments, courses, programs and also student competencies.

- 12.2. Though the established goals, objectives and desired outcomes of the university college would be important benchmarks of the audit, the evaluation efforts, being focused on value-adding features, may point to the revisiting of certain objectives and activities of the curriculum.
- 12.3. In this way, the university college will be made aware of what it needs to change and make the necessary adjustments to stay abreast of the latest developments of knowledge. In the end, the curriculum is intended to develop graduates who demonstrate proficiency in general knowledge, communication, critical thinking, contextual competence, aesthetic sensibility, professional identity and ethics, leadership capacity, scholarly concern for improvement and motivation for continuing learning.
- 12.4. The curriculum anticipates a qualitative change in the mental and spiritual capacities of students. In this regard, every attempt will be made to transform the capacities of students to a level that would make them change-makers. The evaluation will track these outcomes and assess the qualitative changes gained in each student.
- 12.5. Considering the danger of internal evaluation from the standpoint of defensive pretensions by all concerned, internal evaluations will be counterbalanced by external ones including HERQA, employers and donors. These would be openly discussed for subsequent adjustments.

The department shall do a formative and summative review of the program after four years of implementing this curriculum by collecting feedback from employers and graduates of the program. This formative and summative program review will help to maintain the quality of the program in line with the demand of the employers and the country at large. Methods of quality assurance of the program will include but not be limited to:

- Comprehensive examinations and colleague assessment of examination papers and teaching methods;
- Periodic workshops (with stakeholders, teachers and graduates);
- Assessments by using survey project works (research), internships, and link programs;
- Graduates' evaluation of the program, establishing a graduate alumni organization as a mechanism to implement such evaluations and follow career paths;
- Standardization of course offerings through preparation of general course outlines, exam contents, and external audit;
- Annual assessment of the program by the teaching staff;

- Working closely with the relevant professional associations to assess graduates' performance.

13. Resource Requirements

13.1 Teaching Staff

To the extent that the quality of education to be provided is primarily dependent on the skill and excellence of its staff members, Hope University College shall engage outstanding faculty members from within country and abroad to teach.

13.2 ICT Laboratory

HOPE UNIVERSITY COLLEGE shall avail adequate computer terminals for students and faculty to enable online learning and reading, sharing knowledge and experiences and working with various software that contributes to one's professional development. In such laboratories one shall also get assistance in digital connections and system's use.

13.3 Library Facilities

Students will have access to a spacious and well-stocked library. Computers will be available in the library to provide students with the facility for writing and with internet connectivity for access to e-books and online learning solutions. Students shall use computerized catalogs for instant access to the resources in the library.

13.4. Tutorial Service for a Course Taught

12.4.1. The faculty member of a course is the TUTOR of his/her students.

12.4.2. To enable the tutoring, the faculty member shall designate office hours and inform his students of the same. The faculty member is expected to be in his office during the hours designated.

13.5. Guidance and Counseling

13.5.1. The office of student life shall provide guidance in a number of areas that contribute to the character development of students focusing on themes such as interpersonal relations, personal acceptance and care, life goals, survival skills, work ethics, relations with the opposite gender, community responsibility, right assertiveness, handling grievance and personal crisis, tolerance, reconciliation, time management, self-assessment, etc. in an open-ended and non-judgmental manner.

13.5.2. The office of student life shall avail counseling service to those students that exhibit emotional burden, are at a loss, have a hard time focusing on their studies and

responsibilities and show difficulty in relating to others. If the mental state of a student requires professional help, the student shall be told to seek professional help at his expense. Severe cases shall be allowed to take a semester or a year off.

13.5.3. As counseling revolves around trust, a female counselor shall be available for women and a male counselor for men. Furthermore peer counseling as well as peer discussion will be held to facilitate the growth and discovery processes in a non-judgmental way.

13.5.4. All counseling communications will be confidential.

13.5.5. The university college shall do its best to reduce impersonality and the kind of atomization that comes from large crowds. While the architecture of the university college is designed to help in this regard by giving ample opportunities for students to interact with one another, every effort shall be made to provide a sense of community that encourages belongingness, involvement and high spirits.

12.5.6. Common problems shall addressed by the university college and remedies sought as quickly as possible so that unaddressed problems do not cause more harm than what exists.

14. Class Size

To enable manageable faculty attention to students and assure the continuous assessment policy, the optimal class size of the university college shall be:

- 25 to 35 students for courses in a regular class,
- 50 to 60 students for lecture type courses,
- 15 to 25 students for workshops and laboratories.

15. Program Structure

The Information Technology program is designed to be completed within eight semesters. Each semester shall have 16 class weeks excluding final exam administration and other administrative tasks.

There shall be one internship program two and a half months before the end of the third academic year. During this period students will have a chance to work in an actual work setting using their competency.

The courses in the program are major, supportive and general courses. The major courses are compulsory and shall be 105 credit hours for one to graduate. The major, supportive and general courses are presented below.

16. List of Courses

16.1 Major Courses

Course Code	Course Title	Credit Hours	Lecture Hours	Lab. Hrs*	Prerequisite
INTE 201	Introduction to Information Communication Technology	4	3	2	None
INTE 212	Fundamentals of Programming	4	3	2	INTE 201
INTE 242	Digital Electronics and Logic Design	3	3	0	INTE 201
INTE 311	Object Oriented Programming	4	3	2	INTE 212
INTE 313	Data Structures and Algorithms Analysis	3	2	2	INTE 212
INTE 331	Structured System Analysis and Design	3	3	0	INTE 201
INTE 312	Internet Programming I	3	2	2	INTE 212
INTE 322	Fundamentals of Database Management Systems	3	2	2	INTE 201
INTE 341	Data Communications and Computer Networks	4	4	0	INTE 201
INTE 342	Computer Architecture and Organization	3	3	0	INTE 242
INTE 413	Advanced Programming	3	2	2	INTE 311
INTE 415	Internet Programming II	3	2	2	INTE 312
INTE 421	Advanced Database Management Systems	3	2	2	INTE 322
INTE 431	Object Oriented Software Engineering	3	3	0	INTE 331, INTE 311
INTE 441	Operating Systems	4	3	2	INTE 313
INTE 455	Computer Graphics	3	2	2	INTE 313
INTE 432	Introduction to Artificial Intelligence	3	2	2	INTE 313, MATH 203
INTE 442	Systems and Network Administration	3	2	2	INTE 341, INTE 441
INTE 444	Computer Maintenance and Technical Support	3	2	2	INTE 201
INTE 446	Wireless Communications and Mobile Computing	3	2	2	INTE 341
INTE 452	Web Technologies	3	2	2	INTE 415
INTE 460	IT Project Management	3	3	0	INTE 331
INTE 462	Internship	3	0	6	Completion of Third Year Courses
INTE 533	Human Computer Interaction	3	3	0	PSYC 201, INTE 201
INTE 541	Network Device Configuration and Troubleshooting	4	2	4	INTE 341
INTE 557	Multimedia Systems	3	2	2	INTE 313
INTE 565	Senior Project I	3	0	6	INTE 415, INTE 421, INTE 431
INTE 504	Information and Society	3	3	0	INTE 201
INTE 540	UNIX System Administration and Support	3	2	2	INTE 441
INTE 564	Information Assurance and Security	3	3	0	INTE 442, INTE 421
INTE 566	Senior Project II	3	0	6	INTE 565
Total		99	69	60	

Remark: *1 Credit hour is equivalent to 1 lecture hour or 2 to 3 hours of laboratory sessions.

16. 2 Major Elective Courses

Course Code	Course Title	Credit Hours	Lecture Hours	Lab. Hours	Prerequisite
INTE 511	Formal Language Theory	3	3	0	INTE 413, MATH 204
INTE 513	Introduction to Compiler Design	3	2	2	INTE 313
INTE 543	Introduction to Distributed Systems	3	2	2	INTE 341
INTE 557	E-Commerce	3	3	0	None
INTE 544	Introduction to Telecom Technologies	3	2	2	INTE 341
INTE 556	GIS and Remote Sensing	3	2	2	INTE 455
INTE 558	Simulation and Modeling	3	2	2	STAT 301, INTE 557
INTE 568	Selected Topics in IT	3	3	0	Completion of Third Year Courses
Total		6	4/5/6	0/2/4	

16. 3 Supportive Courses

Course Code	Course Title	Credit Hours	Lecture Hours	Lab. Hours	Prerequisite
MATH 203	Mathematics I	4	4	0	None
MATH 204	Mathematics II	4	4	0	MATH 203
MAEN 214	Introduction to Small Business Management and Entrepreneurship	3	3	0	None
STAT 301	Introduction to Probability and Statistics	3	2	2	MATH 203
Total		14	13	2	

16.4 General Courses

Course Code	Course Title	Credit Hours	Lecture Hours	Lab. Hours	Prerequisite
CEED 201	Civics and Ethical Education	3	3	0	None
FLEN 201	Basic writing skills	3	3	1	
ECON 202	Microeconomics	3	3	0	None
FLEN 202	English for Communication I	3	3	1	FLEN 201
PHIL 201	Introduction to Logic	3	3	0	None
FLEN 301	English for Communication II	3	3	1	FLEN 202
PSYC 201	General Psychology	3	3	0	None
MAEN 441	Leadership Skills	3	3	0	None
Total		24	24	3	

17 Minimum Credit Hour Requirement Summary

Course Categories	Credit Hours
Major including Internship	99
Major Electives	6
Supportive	14
General Courses	24
Grand Total	143

18. Semester Course Break-Down

18.1 Regular

Year	Semester I			
1	Course No	Course Title	Cr. Hrs	
	INTE 201	Introduction to Information and Communication Technology	4	
	MATH 203	Mathematics I	4	
	CEED 201	Civics and Ethical Education	3	
	FLEN 201	Basic writing skills	3	
	PHIL 201	Introduction to Logic	3	
			Semester Total	17
	Semester II			
	Course No	Course Title	Cr. Hrs	
	INTE 212	Fundamentals of Programming	4	
	INTE 242	Digital Electronics and Logic Design	3	
	FLEN 202	English for Communication I	3	
	MATH 204	Mathematics II	4	
	ECON 202	Microeconomics	3	
		Semester Total	17	

Year	Semester I			
2	Course No	Course Title	Cr. Hrs	
	INTE 311	Object Oriented Programming	4	
	INTE 313	Data Structures and Algorithms Analysis	3	
	INTE 331	Structured System Analysis and Design	3	
	INTE 341	Data Communication and Computer Networks	4	
	FLEN 301	English for Communication II	3	
			Semester Total	17
	Semester II			
	Course No	Course Title	Cr. Hrs	
	INTE 312	Internet Programming I	3	
	INTE 322	Fundamentals of Database Management Systems	3	
	INTE 342	Computer Architecture and Organization	3	
	PSYC 201	General Psychology	3	
	MAEN 214	Introduction to Small Business Management and Entrepreneurship	3	
STAT 301	Introduction to Probability and Statistics	3		
		Semester Total	18	

Year	Semester I			
3	Course No	Course Title	Cr. Hrs	
	INTE 413	Advanced Programming	3	
	INTE 415	Internet Programming II	3	
	INTE 421	Advanced Database Management Systems	3	
	INTE 431	Object Oriented Software Engineering	3	
	INTE 441	Operating Systems	4	
	INTE 455	Computer Graphics	3	
			Semester Total	19
	Semester II			
	Course No	Course Title	Cr. Hrs	
	INTE 432	Introduction to Artificial Intelligence	3	
	INTE 442	Systems and Network Administration	3	
	INTE 444	Computer Maintenance and Technical Support	3	
	INTE 446	Wireless Communication and Mobile Computing	3	
	INTE 452	Web Technologies	3	
	INTE 460	IT Project Management	3	
			Semester Total	18
Summer Semester				
INTE 462	Internship (offered between the two semesters)		3	
		Semester Total	3	

Year	Semester I			
4	Course No	Course Title	Cr. Hrs	
	INTE XXX-	Elective I	3	
	INTE 533	Human Computer Interaction	3	
	INTE 541	Network Device Configuration and Troubleshooting	4	
	INTE 557	Multimedia Systems	3	
	INTE 565	Senior Project I	3	
			Semester Total	16
	Semester II			
	Course No	Course Title	Cr. Hrs	
	INTE XXX	Elective II	3	
	INTE 504	Information and Society	3	
	INTE 540	UNIX System Administration and Support	3	
	INTE 564	Information Assurance and Security	3	
	INTE 566	Senior Project II	3	
	MAEN 441	Leadership Skills	3	
			Semester Total	18
			Grand Total	144

18.2 Extension

<i>Year</i>	<i>Semester I</i>		
<i>1</i>	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 201	Introduction to Information and Communication Technology	4
	MATH 203	Mathematics I	4
	FLEN 201	Basic writing skills	3
	<i>Semester Total</i>		<i>11</i>
	<i>Semester II</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 212	Fundamentals of Programming	4
	FLEN 202	English for Communication I	3
	MATH 204	Mathematics II	4
	<i>Semester Total</i>		<i>11</i>
	<i>Semester III (Summer)</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	CEED 201	Civics and Ethical Education	3
ECON 203	Microeconomics	3	
<i>Semester Total</i>		<i>6</i>	
<i>2</i>	<i>Semester I</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 242	Digital Electronics and Logic Design	3
	INTE 311	Object Oriented Programming	4
	PHIL 201	Introduction to Logic	3
	<i>Semester Total</i>		<i>10</i>
	<i>Semester II</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 322	Fundamentals of Database Systems	3
	INTE 331	Structured System Analysis and Design	3
	INTE 341	Data Communication and Computer Networks	4
	<i>Semester Total</i>		<i>10</i>
	<i>Semester III (Summer)</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
FLEN 301	English for Communication	3	
PSYC 201	General Psychology	3	
<i>Semester Total</i>		<i>6</i>	

<i>Year</i>	<i>Semester I</i>		
3	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 313	Data Structures and Algorithms Analysis	3
	INTE 413	Advanced Programming	3
	INTE 342	Computer Architecture and Organization	3
	MAEN 215	Introduction to Entrepreneurship and Small Business Management	3
	<i>Semester Total</i>		12
	<i>Semester II</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 312	Internet Programming I	3
	INTE 421	Advanced Database Management Systems	3
	INTE 431	Object Oriented Software Engineering	3
	INTE 455	Computer Graphics	3
	<i>Semester Total</i>		12
	<i>Semester III (Summer)</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
INTE 415	Internet Programming II	3	
STAT 301	Introduction to Probability and Statistics	3	
<i>Semester Total</i>		6	
4	<i>Semester I</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 441	Operating Systems	4
	INTE 444	Computer Maintenance and Technical Support	3
	INTE 541	Network Device Configuration and Troubleshooting	4
	<i>Semester Total</i>		11
	<i>Semester II</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 432	Introduction to Artificial Intelligence	3
	INTE 540	UNIX System Administration and Support	3
	INTE 452	Web Technologies	3
	INTE 460	IT Project Management	3
	<i>Semester Total</i>		12
	<i>Semester III (Summer)</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE xxx	Elective I	3
	INTE 442	Systems and Network Administration	3
	<i>Semester Total</i>		6
<i>Semester III (Summer)</i>			
INTE 462	Internship (offered between the two semesters)	3	
<i>Semester Total</i>		3	

<i>Year</i>	<i>Semester I</i>		
5	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE xxx	Elective II	3
	INTE 533	Human Computer Interaction	3
	INTE 557	Multimedia Systems	3
	INTE 446	Wireless Communication and Mobile Computing	3
	<i>Semester Total</i>		<i>12</i>
	<i>Semester II</i>		
	<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>
	INTE 504	Information and Society	3
	INTE 564	Information Assurance and Security	3
	INTE 565	Senior Project I	3
LEAD 501	Leadership Skills	3	
<i>Semester Total</i>		<i>12</i>	
<i>Semester III (Summer)</i>			
<i>Course No</i>	<i>Course Title</i>	<i>Cr. Hrs</i>	
INTE 566	Senior Project II	3	
<i>Semester Total</i>		<i>3</i>	

19. Course Information

19.1 Major Course

Course Title: Introduction to Information and Communication Technology

Course Number: INTE 201

Credit Hour: 4

Prerequisite: None

Course Description

This course provides an overview of Information and Communication Technology. Topics include the development of computers, data representation, logical organization of a computer system, computer software, computer hardware, computer networking and communication, problem solving using computers, operating systems (single and multi-user) and the windows environment. The course also discusses information system components and types of information systems. This course will be supported by a practical laboratory sessions where students are exposed to hands-on experience in using computers. Specifically they will work on Microsoft Windows operating system followed by office applications (like MS-Word, MS-Excel) and other useful and software tools and applications.

Course Objectives

On completion, students will be able to:

- Explain what IT and ICT are and how they are used as an enabler tool for development
- Understand of the components of modern technological infrastructures, such as relevant hardware, software, networks, telecommunications and internet systems.
- Use computers for general operations using Windows operating systems and applications software.

Course Content

1. Overview of Computers and Communication Systems

- 1.1. Development of ICT: From analog to Digital
- 1.2. Generation of Computers
- 1.3. Information Explosion
- 1.4. Impact of ICT on the organization

2. Computer Hardware

- 2.1. Basic Concepts

2.2. Components of a computer system

2.2.1. Input devices

2.2.2. The processor

2.2.3. Output devices

2.2.4. Secondary Storage devices

2.2.5. Peripheral Equipment

2.3. Data representation in Computer

2.4. The System Unit

2.4.1. Central Processing Unit

2.4.2. Memory

3. Computer Software

3.1. System Software

3.2. Application Software

4. Binary number system and computer System Architecture

4.1. Binary Number System

4.2 Computer System Architecture

5. Multi-users and Networking

5.1 Basic Concepts

5.2 Network Service Applications

5.3 Types of Networks

5.3.1. Wide Area Network

5.3.2. Local Area Network

5.3.3. Metropolitan Area Network

5.4. Network Hardware and Communication Channels

5.5. Network Operating Systems: Protocol and Communication Control

5.6. Network Architecture

6. ICT and Society

6.1. The Information Super high way

6.2. Issues in ICT and National Development

6.3. ICT and the Future

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests 20%

Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Shelly, Cashman and Vermatt, Discovering Computers 2007/2006, Thomson Course Tech., 2007/2006.

References

1. R. Rainer, E. Turban and R. Potter, Introduction to Information Systems, 2007, INBN 13 978- 0-471- 73636- 3, John Wiley and Sons, Inc.
2. Peter Norton, Computing Fundamentals, 4th Ed., 2001, McGraw Hill
3. June Jamrich Parsons and Dan Oja, Computer Concepts, 5th edition, Thomson Course Tech., 2004
4. Williams, Sawyer and Hutchinson, Using Information Technology, 3rd edition, McGrawHill,1999
5. Zimmerman, Information Technology Applications, 2007, Thomson Course Tech.
6. Keyboarding & Information Processing, 1997, South Western Educational Publishing

Course Title: **Fundamentals of Programming**
Course Number: **INTE 212**
Credit Hour: **4**
Prerequisite: **Introduction to Information and Communication Technology**

Course Description

In this course general programming principles and concepts will be dealt with focusing on structured programming and problem solving techniques. The structured programming approach will be practically implemented using the C++ programming language. Problem solving techniques, simple algorithm design, testing and debugging techniques, and documentation standards will also be covered. The C++ syntactical elements and their semantics will also be learnt for the student. This includes but not limited to elementary operators, data types, control structures, user-defined and library functions, basic input/output, sequential files, arrays and structures. This course will be appropriate for students with little or no programming experience but who are comfortable using computers with modern GUI-based operating systems. This course is supported by a rigorous laboratory sessions.

Course Objectives

On completion of this course students will be able to:

- Apply the knowledge acquired in previous courses appropriately
- Assimilate the way a programmer thinks while mapping real world problems into computer programs
- Explain the various techniques of writing computer programs
- Apply the knowledge of writing, editing, compiling, running and debugging programs
- Explain and demonstrate steps involved in program development
- Apply the simple C++ data types, operators, and constructs in programs and explain how they are represented in the machine
- Apply the structured programming constructs: sequence, selection and iteration in solving problems
- Perform elementary interactive input and output operations;
- Apply, define and use the structured C++ data types: arrays, strings, structures in applications drawn from mathematics, the sciences, and other areas;
- Use text files to record and retrieve information in elementary applications;

- Demonstrate the ability of writing well-documented, user-friendly programs of short to medium length.

Course Content

Chapter 1 Introduction to Programming

- General Introduction to computer and programming
- Software Development Life Cycle (SDLC)
- Feasibility Study
- Requirement Analysis
- Designing Solution
- Testing Designed Solution
- Implementation(Coding)
- Unit Testing
- Integration and System Testing
- Maintenance
- Algorithm development and representation
 - Structured Chart
 - Pseudocode
 - Flow chart

Chapter 2 C++ Basics

- Structure of C++ Program
- C++ IDE
- Showing Sample program
- Keywords, Identifiers, Inputs, Outputs, Comments, Parts of a program
- Data Types, Variables, and Constants
- Operators
- Precedence of Operators

Chapter 3 Control Statements

- If statements: If...else, nested if
- Switch Statements: Multiple cases, break, Default
- Looping: for, while, do, break, continue, Nested Loops

Chapter 4 Functions

- Introduction
- Function Parameters
- Passing by Value and Reference

- Default argument and constant reference argument
- Calling Functions and Returning Values
- Function overloading

Chapter 5 Arrays

- Declaration and referring array
- Utilization of array
- Array in memory
- Multidimensional array
- Pointers
 - Pointer variable
 - Pointer comparison
- String manipulations

Chapter 6 Files

- Basics of files
- Writing a text file
- Reading a text file
- Manipulating a binary file
- Manipulating a random access file

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Joel Adams & Larry Nyhoff, An Introduction to Computing, 3rd ed., 2003, Prentice Hall

References

1. D. S. Malik, C++ Programming: From Problem Analysis to Program Design, 2nd edition, 2004, Course Technology Publisher.
2. Walter Savitch, Problem Solving with C++, 5th & 6th editions, Pearson Education Inc.,2005/2009
3. Steven Prata, C++ Primer Plus, 3rd ed., Sams Publishing,1998
4. Tony Gaddis, Standard Version of Starting Out with C++, 4th ed., 2005
5. Deitel & Deitel, C++ How to Program, Prentice Hall, 1994

Course Title: Digital Electronics and Logic Design
Course Number: INTE 242
Credit Hour: 3
Prerequisite: Introduction to Information Communication Technology

Course Description

This course deals with the fundamentals of digital systems building blocks. This includes the digital logic circuit elements like logic gates, Boolean algebra, Boolean function simplification, digital logic design like half and full adders, MSI chip elements like de/multiplexers, decoder and encoder. Moreover, students will be exposed to both combinational and sequential digital circuits where they analyze and design memory elements using MSI chips. Finally, the course will discuss digital logic families. Most of these concepts are supported by laboratory session to experiment the theory.

Course Objectives

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

- Explain the basic operation of various digital systems.
- Describe and solve problems involving digital systems using Boolean algebra or logic gates.
- Understand basic digital electronic systems.
- Analyze and simplify digital logic circuits using the various simplification techniques like kmap.

Course Content

CHAPTER 1 NUMBER SYSTEM AND CODES

- 1.1 Efficiency of a number system
- 1.2 Radix conversion
- 1.3 Arithmetic with base other than ten
- 1.4 Alphanumeric codes

CHAPTER 2 BOOLEAN ALGEBRA AND COMBINATIONAL LOGIC DESIGN

- 2.1 Basic Boolean functions
- 2.2 Postulates and theorems of Boolean Algebra
- 2.3 Minimization of Boolean functions
- 2.4 Sum of product of product of sum forms
- 2.5 K- map of switching functions

CHAPTER 3 LOGIC FAMILIES AND DIGITAL IC's

- 3.1 RTL, DTL, TTL, ECL and MOS families and their characteristics
- 3.2 Internal circuits of basic gates
- 3.3 Multiplexer and demultiplexer
- 3.4 Encoder and decoder
- 3.5 Half-adder and full-adder
- 3.6 Subtractor and magnitude comparators.

CHAPTER 4 SEQUENTIAL LOGIC CIRCUITS

- 4.1 Synchronous and asynchronous operation
- 4.2 SR, JK, D and T flip-flops
- 4.3 Analysis of synchronous and asynchronous sequential circuits
- 4.5 Memories.

CHAPTER 5 DESIGN OF DIGITAL SYSTEMS

- 5.1 Examples for combinational logic circuit design
- 5.2 Sequential logic circuit design –
- 5.3 State minimization
- 5.4 Design of counters using flip-flops
- 5.5 System design using multiplexer and demultiplexer
- 5.6 Design using PAL and PLA – ADC and DAC circuits.

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%
Test 3	10%
Assignments	30%
Assignment I	10%
Assignment II	10%
Assignment III	10%
Final exam	40%
Total	100%

Text Book

Morris M. Mano, Computer System Architecture, 3rd Ed., Prentice Hall

References

1. Roger L. Tokheim, Digital Electronics: Principles and Applications Robert, McGraw Hill, 5th edition, 1999.
2. Thomas L. Floyd, Digital Fundamentals, 6th Ed., 1997, Prentice Hall
3. Joseph J. Carr, Operational Amplifiers and Linear ICs with Applications, 1990, Harcourt Brace Jovanovich Inc.

Course Title: Object Oriented Programming

Course Number: INTE 311

Credit Hour: 4

Prerequisite: Fundamentals of Programming

Course Description

This course is designed to provide the fundamental theories; principles and techniques of object oriented programming. Topics to be dealt with are: classes, objects, data abstraction, encapsulation, information hiding, overloading, inheritance, polymorphism, exceptions handling. This course gives an opportunity for students to work on the Java programming language during the practical session to implement; test and experiment on object oriented paradigm of program design and implementation.

Course Objectives

Upon completion of the course students will be able to:

- Compare and contrast the two known programming paradigms structural programming and Object Oriented Programming,
- Understand basic object oriented concepts such as object, class, abstraction, hierarchy, modularity and encapsulation,
- Successfully carry out a project on the edit-compile-run cycle of software development in an appropriate software development environment,
- Use Java to implement and experiment on object oriented program development techniques and principles.

Course Content

1. Introduction to Object-Oriented Programming

1.1 Types of computer languages

1.2 Overview of OO principles

1.3 Overview of Java Programming and types of Java Program

- Definition of Java Application, Java Applets
- Editing, Compiling and Interpreting

2. Basics in Java Programming

2.1 Variable types and identifiers

2.2 Number types, strings, constants

2.3 Operators and operator precedence

2.4 Type Conversion/ Casting

3. Decision and Repetition Statements

3.1 Overview of Java statements

3.2 If statement

3.3 Switch statement

3.4 For loop

3.5 While, Do while loop

4. Objects and Classes

4.1 Object variables

4.2 Defining a class

4.3 Instantiating and using objects

4.4 Instance fields, Construction and methods

5. OOP Concepts

5.1 Inheritance, Method overloading and overriding

5.2 Encapsulation

5.4 Polymorphism

5.4 Abstract classes and Interfaces

6. AWT and Swing

6.1 Components of AWT and Swing

- Frame, Label, Button, TextField, ComboBox,..

- JFrame, JLabel, JButton, JTextField, JComboBox..

6.2 Event handling

- Sources

- Listeners

- Events

7. Java Applets

7.1 Overview of Java Applets

7.2 Java Applets Vs Java Application

7.3 HTML tags and Java Applets

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%

Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Deitel & Deitel, Java How to Program, Pearson Education Inc., 3rd/8th ed., 1999/2010

References

1. Sanders K. E. and Andy Van Dam. 2005. Object-Oriented Programming in Java: A Graphical Approach, Preliminary Edition. ISBN-10 0321245741.
2. Shildt, Herbert. 2006. Java 2: the Complete Reference (Osborne Complete Reference List), 7th Edition, ISBN-10 0072263855. 1024 p.
3. Cay S. Horstmann and Gary Cornell, Core Java 2 Volume I – Fundamentals (7th ed), USA, Prentice Hall PTR, 2004
4. Cay S. Horstmann and Gary Cornell, Core Java 2 Volume II - Advanced Features (7th ed), USA, Prentice Hall PTR, 2004
5. Keneth Litwak, Pure Java 2, Sams Publishing Inc., 2000

Course Title: Data Structures and Algorithms Analysis

Course Number: INTE 313

Credit Hour: 3

Prerequisite: Fundamentals of Programming

Course Description

This course focuses on the study of data structures, algorithms and program efficiency. It helps students not only write working programs but also to evaluate their efficiency in terms of processor time utilization and memory usage. Topics include analysis of time and space requirement of algorithms; program efficiency improving techniques; abstract data types such as linked lists, stacks, queues, and trees; simple and advanced searching and sorting algorithms. By making object oriented programming a prerequisite it is intended to be able to deliver this course using an object oriented programming paradigm. The course is accompanied by rigorous laboratory sessions.

Course objectives

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

- Understand and explain the theories and principles of data structures and algorithms
- Grasp the essence of writing efficient programs
- Comprehend how to create abstract data types and structures
- Analyze programs' space and time complexity
- Write efficient programs using the appropriate data structures and algorithms
- Explain the workings, pros and cons of sorting and searching algorithms

Course Content

1. Introduction

- Software Engineering Principles
- Data Structures
- Algorithms

2. Algorithm Analysis Concepts

- Measuring Complexity
- Complexity of Algorithm
- Big –Oh Notation.

3. Time Complexity of Known Algorithms

4. Simple Sorting and Searching Algorithms

- Bubble Sort

- Insertion Sort
- Selection Sort
- Sequential Searching
- Binary Searching

5. Data Structures and Applications

- Abstract Data Types
- Structures
- Pointers
- Arrays
- Linked Lists
- Stacks
- Queues
- Trees.

6. Advanced Sorting and Searching Algorithms

- Shell sort
- Quick Sort
- Heap sort
- Merge Sort
- Hashing

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Richard & Lewis, Fundamentals of Object Oriented Programming & Data Structures in Java, 2000, Cambridge University Press

References

1. Kathryn E. Sanders & Andries van Dam. 2005. Object Oriented Programming in Java: A Graphical Approach. ISBN 0-321-24574-1.
2. Horowitz, Ellis, Sartaj Sahni & Dinesh Mehta. 1995. Fundamentals of Data Structures in C++. Computer Science Press.
2. Reingold, Edward M. & Wilfred J. Hansen. 1983. Data Structures. CBS Publishers & Distributers.
3. Sahni and Sartaj. 1999. Data Structures, Algorithms and Applications in C++. McGrawHill.
4. Weiss and Mark. 1997. Data Structures and Algorithms Analysis in C. Benjamin Cummings Publishing.

Course Title: Structured Systems Analysis and Design

Course Number: INTE 331

Credit Hour: 3

Prerequisite: Introduction to Information and Communication Technology

Course Description

This course covers information systems theory. Topics include organization and management; types of information systems; roles in development; development life cycle; information systems development methodologies; approaches to development, requirements structuring, structural modeling and analysis, principles of structured systems development using and the principles of modeling. An individual or team project involving system analysis and design is also a major component of this course.

Course objectives

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

- Grasp the theories and principles of systems analysis and design
- Understand the concept of system thinking
- Conceptualize lifecycles of system development
- Internalize object oriented system analysis and design techniques
- Analyze complex systems to structure and organize them into manageable parts
- Perform analysis, design and implementation of small and medium scale information systems

Course Content

1. Introduction to Systems “Analysis and Design”

- The Systems Development Environment
- Definition of a System
- Systems Thinking
- Information Systems
- Information Systems Building Blocks
- Systems Development Life Cycle
- Succeeding as a System Project

2. Managing Information Systems Project

- Initiating and Planning a project
- Representing and Scheduling Project Plans

3. Information System Development:

- Methodologies
- Approaches and
- Tools

4. Determining System Requirements

- Traditional Methods
- Modern Methods
- Radical Methods

5. Structuring System Requirements: Process Modeling

- System Concepts for Process Modeling
- DFD
- Constructing Process Models
- Structuring System Requirements: Data Modeling

6. Structuring System Requirements: Data Modeling

- System Concepts for Data Modeling
- Logical Data Modeling
- E-R Modeling
- Constructing Data Models

7. Structuring System Requirements: Logic Modeling

- Structured English
- Decision Tables
- Decision Trees-

8. System Design

9. System Implementation & Maintenance

Method of Teaching

- Lecture supported by class work exercises, Group/ individual assignments and Projects

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Course Project	20%

Final exam	40%
Total.....	100%

Text Book

Hoffer, J. A. and Joey F. George. 2007. Modern System Analysis and Design 5^e
Joseph S Valacich, 648 p. ISBN-10 0132240769.

References

1. Shelly, Cashman, & Rosenblatt, System Analysis & Design, 4th Ed., 2001, Thomson Course Tech.
2. Kendall K.E. & Kendall J.E. Systems Analysis and Design(7th ed), USA, 816 p.
3. J.C.Wetherbe & N.P. Vitalari, System Analysis & Design: Best Practices, 4th Ed., West Publishing Company
4. J.W. Seatzinger et el., System Analysis & Design in a Changing World, Thomson Course Tech.
5. John G. Burch, System Analysis, Design & Implementation, 1992, Division of South Western Publishing

Course Title: Internet Programming I
Course Number: INTE 312
Credit Hour: 3
Prerequisite: Fundamentals of Programming

Course Description

This course offers an overview of the internet and the World Wide Web. Topics include characteristics of web-based information systems; client-server architecture; web server and security, HTTP protocol; web page design and development; information architecture and visualization, static & dynamic pages and client-side programming using markup and scripting languages (HTML, JavaScript, VBScript);

Course Objectives

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

- Understand the internet and World Wide Web (WWW).
- Grasp the essence and application of web-based information systems.
- Analyze, design and develop small scale web-based information systems.
- Produce both static and dynamic web pages.

Course Content

1 Introduction to Computers and the Internet

- 1.1 Introduction
- 1.2 HTML5, CSS3, JavaScript, Canvas and jQuery
- 1.3 Demos
- 1.4 Evolution of the Internet and World Wide Web
- 1.5 Web Basics
- 1.6 Multitier Application Architecture

2 Introduction to HTML5: Part 1

- 2.1 Introduction
- 2.2 Editing HTML5
- 2.3 First HTML5 Example
- 2.4 W3C HTML5 Validation Service
- 2.5 Headings
- 2.6 Linking
- 2.7 Images
- 2.8 Special Characters and Horizontal Rules
- 2.9 Lists Contents

- 2.10 Tables
- 2.11 Forms
- 2.12 Internal Linking
- 2.13 meta Elements

3 Introduction to HTML5: Part 2

- 3.1 Introduction
- 3.2 New HTML5 Form input Types
- 3.3 input and datalist Elements and autocomplete Attribute
- 3.4 Page-Structure Elements

4 Introduction to Cascading Style Sheets (CSS): Part 1

- 4.1 Introduction
- 4.2 Inline, Embedded and Conflicting Styles
- 4.3 Linking External Style Sheets
- 4.4 Positioning Elements:
- 4.5 Backgrounds
- 4.6 Element Dimensions
- 4.7 Box Model and Text Flow
- 4.8 Media Types and Media Queries
- 4.9 Drop-Down Menus

5 Introduction to Cascading Style Sheets (CSS): Part 2

- 5.1 Introduction
- 5.2 Text Shadows
- 5.3 Rounded Corners
- 5.4 Color
- 5.5 Box Shadows
- 5.6 Gradients
- 5.7 Multiple Background Images
- 5.8 Image Borders
- 5.9 Animation; Selectors
- 5.10 Transitions and Transformations
- 5.11 Multicolumn Layout
- 5.12 Media Queries

6 JavaScript

- 6.1 Introduction

- 6.2 Control Statements
- 6.3 JavaScript: Functions
- 6.4 Arrays
- 6.5 Objects
- 6.6 Document Object Model (DOM)
- 6.7 JavaScript Event Handling

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Paul Dietel, Internet & World Wide Web: How to Program, 5th Edition, 2011,

References

1. Shelly et al., HTML Comprehensive Concepts and Techniques, 2nd Ed., Thomson Course Tech. Jennifer Niederst, Web Design in A Nutshell, 1999, O'Reilly & Associates inc., [2]
2. Linda & William Weinman, Creative html design.2, 2001, New Riders
3. Don Gosselin, JavaScript Comprehensive, 2000, Thomson Course Tech.
4. Eric M. & William J., Dynamic HTML in Action, 2nd Ed., 1999, Microsoft Press
5. Peter den Haan et al., Beginning JSP 2: From Novice to Professional, 2004, APress
6. Chris Goode et al., Beginning ASP.NET 1.0 with Visual Basic.NET, 2002, Wrox Press Ltd.
7. Susane Clark et al., VBScript Programmer's Reference, 1999, Wrox Press Ltd.
8. Danny Goodman, Dynamic HTML – The Definitive Reference, 2002, O'Reilly

Course Title: **Fundamentals of Database Management Systems**
Course Number: **INTE 322**
Credit Hour: **3**
Prerequisite: **Introduction to Information Communication Technology**

Course Description

This course exposes students to the design and implementation of database systems. Topics covered include definition of a database and benefits of database systems, architecture for database systems, implications of file organization and storage structures, hierarchical and network data models, relational data model, data structures and integrity rules, database design, relational algebra and relational calculus.

Course Objectives

At the end of the Course students will be able to:

- Explain the different models of database,
- Design models from specifications and interpret them into relational tables,
- Write statements for data creation and manipulation purposes,
- Optimize databases to the most efficient form,
- Distinguish and use relational model and relational algebra,
- Identify and fix the possible problems that may occur in securing data

Course Content

1. Introduction

- Manual file handling systems and limitations
- Traditional File based systems
- Database approach
- Functions and Components of DBMS
- Database Development Lifecycle
- Roles in database design environment
- Database Languages (DDL, DML)

2. Relational Model

- Terminology
- Data models
- Relational Constraints
- Relational languages and views

- Relational DBMS
3. **Conceptual Database Design – E-R modeling**
 - Basic concepts of E-R model
 - Structural constraints
 - Problem with E-R models
 - Enhanced E-R models
 4. **Logical Database Design**
 - Normalization
 - Purpose of normalization
 - Functional dependencies
 - Different Normal Forms
 - Process of normalization
 5. **Physical Database Design**
 - Design considerations
 - Physical database design process
 - Database design and implementation for relational databases
 6. **Query Languages**
 - Relational algebra
 - Relational calculus
 - Structured Query Languages
 7. **Advanced Database Concepts**
 - Integrity and security
 - Client-server systems
 - Distributed systems
 - Data warehousing
 - **Introduction to SQL (Lab)**
 - Transaction and Query Processing
 - Writing SQL commands
 - Data definition
 - Data manipulation
 - Basic SQL commands and their usage

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Abraham Silberschatz, Henry F. Korth, S. Sudarshan. 2005. Database System Concepts (5th ed). ISBN-10 0071244763. 1024 p.

References

1. Ramez Elmasri, Shamkant B. Navathe. 2006. Fundamentals of Database System s(5th ed). ISBN-10 0321369574.
2. Connolly T.M. and Carolyn E. Begg. 2009. Database Systems: A Practical Approach to Design, Implementation and Management, 5^e. ISBN-10 0321523067 1400 p.
3. Database Processing. Fundamentals, Design and Implementation by David M. Kroenke
4. Peter Rob & Carlos Coronel, Database Systems: Design Implementation and Management, 3rd Ed., Thomson Course Tech. 1997
5. Richard T. Watson, Data Management: Database and Organizations, 4th Ed., Jhon Wiley & Sons, 2004
6. David M. Kroenke et el, Database Processing, Prentice Hall, 11th Ed, 2010

Course Title: Data Communications and Computer Networks
Course Number: INTE 341
Credit Hour: 4
Co-Requisite: Introduction to Information and Communication Technology

Course Description

This course introduces the basic principles and techniques of data communication in computer networks. Topics covered include: application of computer networks; overview of the OSI and TCP/IP reference models, network types; network protocols; analog and digital signals, modulation; guided and unguided transmission media, encoding, multiplexing, synchronous and asynchronous communication, transmission impairments, connecting devices, error detection and correction, multiple access methods, network topologies, network security, network management and an introduction to wireless networks.

Course Objectives

Upon completion of the course students will be able to understand and analyze:

- Basic data communication concepts and principles like topology and network types
- Understand the concept of data encoding, data transmission, transmission media, and resource sharing
- Different types of computer networks and network architectures
- The concept of path selection and routing
- The various security threats and the security mechanisms to use

Course Content

CHAPTER ONE: Introduction to Data Communication

- 1.1. Introduction
- 1.2. Data communication system
- 1.3. Data communication links
- 1.4. Serial data formats
- 1.5. Encoded data formats
- 1.6. Transmission Media

CHAPTER TWO: Open Systems Network Models

- 2.1. Introduction
- 2.2. Data Topologies
- 2.3. Data switching
- 2.4. Types of Networking

CHAPTER THREE: The Open Systems Interconnection (OSI) Model

- 3.1. Introduction
- 3.2. The Physical Layer
- 3.3. The Data Link Layer
- 3.4. The Network Layer
- 3.5. The Transport Layer
- 3.6. The Session Layer
- 3.7. The Application Layer
- 3.8. The Presentation Layer
- 3.9. System Network Architecture (SNA)

CHAPTER FOUR: Network Architecture and Protocols

- 4.1. Introduction
- 4.2. IEEE, Ethernet, Token Bus and Token Ring
- 4.3. Network Interface cards
- 4.4. Interconnecting LANs

CHAPTER FIVE: The Internet and TCP/IP

- 5.1. Introduction
- 5.2. Internet History
- 5.3. Intranet and extranet
- 5.4. Services of the Internet
- 5.5. Internet Addresses
- 5.6. Internet Security
- 5.7. TCP/IP

CHAPTER SIX: Integrated Services

- 6.1. Introduction
- 6.2. Integrating Services
- 6.3. Broadband ISDN
- 6.4. Asynchronous Transfer Mode (ATM)
- 6.5. Frame Relay

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1.....	10%

Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

B. A. Forouzan. 2006. Data Communications and Networking (4th ed).

References

- a. W. Stallings: Data and Computer Communications (7th ed), Prentice Hall, , 2004.
- b. D. E. Comer and R. E. Droms: Computer Networks and Internets, with Internet Applications (4th Ed), Prentice Hall, 2003.
- c. A. S. Tannenbaum: Computer Networks (4th ed), Prentice Hall, 2003.
- d. Networking Essentials Plus, Microsoft Press, ISBN:157231902x
- e. Patrick Ciccarelli & Christina Faulkner, Networking Fundations, 2004, Sybex Inc.
- f. Melissia Craft et el., Network+: Exam Prep, 1999, The Coriolis Group
- g. John Ray, Using TCP/IP, 1999, Que Corporation

Course Title: **Computer Architecture and Organization**
Course Number: **INTE 342**
Credit Hour: **3**
Prerequisite: **Digital Electronics and Logic Design**

Course Description

This course exposes students to basic computer organization and architecture concepts. It covers: simple machine architecture, genealogy of microprocessors, von Neumann architecture, the system bus model, data representation and manipulation, organization of instruction sets and program execution, microprocessor organization, memory organization, organization of input and output subsystems, I/O interface; instruction set design philosophies, parallel processing, symmetric multiprocessing and clustering; case study of at least two microprocessor families and other components of computing system.

Course Objectives

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

- Discuss the genealogy of microprocessors
- Understand the workings of microprocessors used in personal computers
- Explain the structure of the personal computer system
- Understand and differentiate the von Neumann vs. The Harvard architectures
- Describe the structure of instruction sets and their effect on registers and memory contents
- Cognize the input output organization of the computer system
- Describe the memory organization of the computer system

Course Content

1. Register Transfer and Microoperations

- 1.1 Register Transfer Language
- 1.2 Bus and Memory Transfers
- 1.3 Arithmetic Microoperations
- 1.4 Logic Microoperations
- 1.5 Shift Microoperations
- 1.6 Arithmetic Logic Shift Unit

2. Basic Computer Organization and Design

- 2.1 Instruction codes
- 2.2 Computer Registers
- 2.3 Computer Instructions
- 2.4 Timing and Control
- 2.5 Instruction Cycle
- 2.6 Design of Basic Computer
- 2.7 Design of Accumulator logic.

3. Central Processing Unit

- 3.1 General Register Organization
- 3.2 Stack Organization
- 3.3 Instruction Formats
- 3.4 Addressing Modes
- 3.5 Data Transfer and Manipulation
- 3.6 Program Control
- 3.7 Characteristics of RISC and CISC processors

4. Input output organization

- 4.1 Peripheral devices
- 4.2 Input output interface
- 4.3 Asynchronous data transfer
- 4.4 Modes of transfer
- 4.5 Priority interrupt
- 4.6 Direct memory access (DMA)
- 4.7 Input output processor (IOP)
- 4.8 Serial communication

5. Memory organization

- 5.1 Memory hierarchy
- 5.2 Main memory
- 5.3 Auxiliary memory
- 5.4 Associative memory
- 5.5 Cache memory
- 5.6 Virtual memory

6. Introduction to Parallel Processing

- 6.1 Pipelining
- 6.2 Vector Processing

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1.....	10%
Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

Morris M. Mano, Computer Systems Architecture, 3rd Ed., Prentice Hall

References

1. Andrew S. Tanenbaum. 2005. Structured Computer Organization, 5^e. ISBN-10 0131485211. 800 p.
2. Mano, M. and Kime, C. 2007. Logic and Computer Design Fundamentals, (4th ed), ISBN-10 013198928X. 607 p.
3. John Hennessey and David Patterson: Computer Architecture: A Quantitative Approach, (4th ed), Morgan Kauffman Publishers, 2003.
4. William Stallings, Computer Organization & Architecture: Designing for Performance, 5th Ed., 1996, Prentice-Hall Inc.

Course Title: **Advanced Programming**
Course Number: **INTE 413**
Credit Hour: **3**
Prerequisite: **Object Oriented Programming**

Course Description

This course is exposes students to more advanced programming philosophies, theories, techniques and practices based on the knowledge and skills acquired in the prerequisite courses. It uses complex and state-of-the-art IDEs being used in the academia and industry for software design, development and testing. Modern programming languages, like Java and C#, and corresponding APIs are used to exemplify the philosophies and principles of advanced program design and development. The course is accompanied by a rigorous student-oriented laboratory work.

Course Objectives

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

- Explain advanced programming philosophies, theories and principles,
- Use Java/C# effectively as a programming language,
- Apply techniques of systematic debugging and performance tuning
- Analyze program requirements, design and implement a full-fledged (that has both a front-end and back-end) software solution using Java/C#.

Course Content

Chapter 1. Object Oriented Features of Java

- 1.1 Data Abstraction and Encapsulation
- 1.2 Classes and Objects
- 1.3 Constructors and Member Access Control
- 1.4 Inheritance
- 1.5 Interfaces and Polymorphism
- 1.6 Interfaces
- 1.7 Abstract Classes
- 1.8 Inner Classes
- 1.9 Packages

Chapter 2. Exception Handling

- 2.1 Error and Exception Handling
- 2.2 Catching Exceptions

- 2.3 Types of Exception
- 2.4 Specifying Exceptions
- 2.5 Catch or Specify Principle
- 2.6 Throwing Exceptions
- 2.7 Messages in Exceptions

Chapter 3. Files and Streams

- 3.1 Introduction
- 3.2 I/O classes
- 3.3 File and File Dialog objects
- 3.4 Low-Level File I/O
- 3.5 High-Level File I/O
- 3.6 Object I/O

Chapter 4. GUI Programming

- 4.1 GUI Programming Overview
- 4.2 Widget Concepts
- 4.3 AWT vs. Swing Java GUI Facilities
- 4.4 GUI Program Outline
- 4.5 Swing Widgets
- 4.6 Layout Management
- 4.7 Using Dialogs
- 4.8 Using Menus, Event Handling

Chapter 5. Network Programming

- 5.1 Introduction
- 5.2 Manipulating URLs
- 5.3 Reading a File on a Web Server
- 5.4 Establishing a Simple Server Using Stream Sockets
- 5.5 Establishing a Simple Client Using Stream Sockets
- 5.6 Client/Server Interaction with Stream Socket Connections
- 5.7 Datagrams: Connectionless Client/Server Interaction

Chapter 6. Threads and Concurrent Programming

- 6.1 Threads in Java
- 6.2 Programming Threads
- 6.3 Thread States: Life Cycle of a Thread
- 6.4 Thread Priorities And Thread Scheduling:

6.4.1 Creating, Executing, Synchronization

Chapter 7. Database Programming (JDBC)

7.1 Creating Databases

7.2 Manipulating Databases with JDBC

7.3 Connecting to and Querying a Database

7.4 Querying a Database

7.5 Stored Procedures

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book:

- Java™ How to Program, 9th Edition, Harvey Deitel and Paul Deitel

References:

- Dawra, Sudhir, Computer programming in Java, Anmol, New Delhi, 2004
- Lemay, Laura ,Sams ,Teach Yourself Java 2 Plat form in 21 Days, SAMS Indianapolis,1999
- Pappas, Chris Debugging Java Troubleshooting for Programmers, McGraw-Hill, New York, 2000

Course Title: Internet Programming II

Course Number: INTE 415

Credit Hour: 3

Prerequisite: Internet Programming I

Course Description

Internet Programming II is a continuation of the course Internet Programming I. Topics to be covered includes: client-side programming using scripting languages like JavaScript; server-side programming and scripting using PHP and web-based database applications development. These topics will be paralleled with laboratory sessions and practical assignments and projects.

Course Objectives

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

- understand the internet and World Wide Web
- grasp essence and application of client-server web-based information systems
- analyze, design and develop dynamic web-based commercial systems

Course Content

Chapter 1 Web Servers (Apache and IIS)

1.1 Introduction

1.2 HTTP Transactions

1.3 Multitier Application Architecture

1.4 Client-Side Scripting versus Server-Side Scripting

1.5 Accessing Web Servers

1.6 Apache, MySQL and PHP Installation

1.7 Microsoft IIS Express and WebMatrix

Chapter 2 PHP

2.1 Introduction

2.2 Simple PHP Program

2.3 Converting Between Data Types

2.4 Arithmetic Operators

2.5 Initializing and Manipulating Arrays

2.6 String Comparisons

2.7 String Processing with Regular Expressions

2.8 Form Processing and Business Logic

2.9 Reading from a Database

2.10 Using Cookies

2.11 Dynamic Content

Chapter 3 Web App Development with ASP.NET in C#

3.1 Introduction

3.2 Web Basics

3.3 Multitier Application Architecture

3.4 Your First ASP.NET Application

3.5 Standard Web Controls: Designing a Form

3.6 Validation Controls

3.7 Session Tracking

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Paul Dietel. 2011. Internet & World Wide Web: How to Program (5th Edition).

References

1. Don Gosselin, JavaScript Comprehensive, 2000, Thomson Course Tech.
2. Peter den Haan et al., Beginning JSP 2: From Novice to Professional, 2004, APress
3. Chris Goode et al., Beginning ASP.NET 1.0 with Visual Basic.NET, 2002, Wrox Press Ltd.
4. Susane Clark et al., VBScript Programmer's Reference, 1999, Wrox Press Ltd.
5. Danny Goodman, Dynamic HTML – The Definitive Reference, 2002, O'Reilly
6. Danny Goodman, JavaScript Bible, 3rd Ed., IDG Books Worldwide Inc.,

7. Shelly Cashman Series, HTML Complete Concepts and Techniques, 3 rd Edition, 2005,
ISBN 0-619-25502-1

Course Title: Advanced Database Management Systems

Course Number: INTE 421

Credit Hour: 3

Prerequisite: Fundamentals of Database Systems

Course Description

This course focuses on the client or user side of database systems. It extends the knowledge in the previous course by adding concepts of database management and use. Topics to be covered are file and record organization, basics of query optimization, transaction management and database security. The course includes an overview of advanced database systems such as Object-Oriented and Object-Relational databases, active databases, deductive databases, multimedia and spatial databases and distributed databases. Current trends in DBMS are also included. This course is supported by a series of laboratory sessions on database management, administration and security issues.

Course Objectives

On completion of this course students will be able to:

- Manage a database system.
- Understand how to organize and use databases effectively
- Identify the related issues with object-relational databases.
- Explain basics of query optimization.
- Understand transaction processing concepts.
- Understand database recovery techniques.
- Identify database security issues.

Course Content

Chapter I: Transaction Management and Concurrency Control

- ❖ Transactions
- ❖ Transaction Support
- ❖ Concurrency Control
 - Problems of Concurrent Sharing
 - Concept of Serializability
 - Concurrency Control Mechanism
- ❖ Database recovery
 - Transaction and Recovery

- Recovery techniques and facilities

Chapter II: Query Processing and Optimization

- ❖ Overview
- ❖ Query Processing steps
- ❖ Query Decomposition
- ❖ Optimization Process
- ❖ Approaches to Query Optimization
- ❖ Transformation Rules
- ❖ Implementing relational Operators
- ❖ Pipelining

Chapter III: Database Integrity, Security and Recovery

- ❖ Integrity
 - Integrity Concept & Subsystem
 - Integrity Constraints
 - Types of Constraints
- ❖ Security
 - Database threats
 - Identification and Authentication
 - Categories of Control
 - Implementation of Security Subsystem
 - Data Encryption

Chapter IV: Distributed Database Systems

- ❖ Concepts of Distributed Databases
- ❖ Distributed Database Design
- ❖ Distributed Query Processing and Transaction Management

Chapter V: Data warehousing and Data Mining Techniques

- ❖ Data Warehousing
 - Introduction
 - Benefits
 - Online Transaction Processing (OLTP) and Data Warehousing
- ❖ Data Mining
 - Introduction
 - Data Mining Techniques

Chapter VI: Object Oriented DBMS

- ❖ Object Oriented Concepts (Abstraction, Encapsulation, and Information hiding)
- ❖ Drawbacks of relational DBMS
- ❖ OODBMS issues
- ❖ OO Database Design and Implementation
- ❖ OO Data modeling and EER diagramming
- ❖ Objects and Attributes
- ❖ Object Identity
- ❖ Object Definition and Query Languages

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Connolly T.M. and Carolyn E. Begg. 2009. Database Systems: A Practical Approach to Design, Implementation and Management, 5th edition. ISBN-10 0321523067. 1400 p.

References

1. Ramez Elmasri, Shamkant B. Navathe , Fundamentals of Database Systems(4th ed) , USA, Addison-Wesley, 2004
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan. 2005. Database System Concepts (5th ed). ISBN-10 0071244763. 1024 p.
3. Micheal Otey & Paul Conte, SQL Server 7 Developer's Guide, McGrawHill, 1999

4. Steven Bobrowski, Oracle7 Server Technology Concepts Manual, 1992
5. Peter Rob & Carlos Coronel, Database Systems: Design Implementation and Management, 3rd Ed., Thomson Course Tech. 1997
6. David M. Kroenke et al., Database Processing, Prentice Hall, 11th Ed., 2010

Course Title: Object Oriented Software Engineering
Course Number: INTE 431
Credit Hour: 3
Prerequisite: Structured Systems Analysis and Design, Object Oriented Programming

Course Description

This course provides a general introduction of software engineering including history of software development from techniques that have been used and their pros and cons, software quality assurance and management and software project management issues. Object Oriented techniques in software life cycle; Object oriented concepts: object, class, encapsulation, data hiding, inheritance, polymorphism and reuse. Principles of object-oriented analysis: definition of classes, attributes and methods, identification of association, aggregation and generalizations. Principles of object-oriented design; system design, object design. Software testing techniques; traditional testing, object-oriented software testing; Configuration management; Software maintenance; and Computer Aided Software Engineering - CASE tools.

Course objectives

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

- Comprehend general concepts and principles of software engineering
- Understand and work with software development life cycles and process models,
- Cognize how to manage software projects,
- Explain how to work in a teams during developing software,
- Internalize object-oriented analysis, design and implementation techniques,
- Apply and use CASE tools for the development of software

Course Content

1 Introduction

- 1.1 Background
- 1.2 A Brief History of Programming
- 1.3 Methodologies
- 1.4 Summary of UML Diagrams

2 Setting the Scene

- 2.1 Object Concepts
- 2.2 Inheritance

2.3 Type Systems

2.4 Software Development Methodologies

3 Understanding and Analyzing the Problem

3.1 Gathering Requirements

3.1.1 Use Cases

3.1.2 Business Perspective

3.1.3 Identifying Business Actors

3.1.4 Writing the Project Glossary

3.1.5 Identifying Business Use Cases

3.1.6 Illustrating Use Cases on a Communication Diagram

3.1.7 Illustrating Use Cases on an Activity Diagram

3.2 Analyzing the Problem

3.2.1 Overview of the Analysis Process

3.2.2 Static Analysis

3.2.3 Finding Classes

3.2.4 Identifying Class Relationships

3.2.5 Drawing Class and Object Diagrams

3.2.6 Drawing Relationships

4 Designing the Solution

4.1 Designing the System Architecture

4.1.1 Introduction

4.1.2 Design Priorities

4.1.3 Steps in System Design

4.1.4 Choosing a Networked System Topology

4.2 Choosing Technologies

4.3 Designing the Subsystems

4.4 Reusable Design Patterns

4.5 Specifying the Interfaces of Classes

4.5 Continuous Testing

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	20%
Test 1	10%

Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Course Project.....	20%
Final exam	40%
Total.....	100%

Text Book

Roger Pressman. 1997. **Software Engineering: A Practitioner's Approach**. 4th Edition. McGraw-Hill.

References

1. Bernd Bruegge and Allen Dutoit. 2000. **Object Oriented Software Engineering: Conquering Complex and Changing Systems**. Prentice Hall.
2. Stephen Schach. 1999. **Classical and Object Oriented Software Engineering with UML and Java**, 4th Edition, McGraw-Hill,
3. Simon Bennet, Steve McRobb, and Ray Farmer. 2002. **Object Oriented Systems Analysis and Design using UML**. McGraw-Hill.
4. Timothy Lethbridge and Robert Laganier. 2002. **Object Oriented Software Engineering: Practical Software Development using UML and Java**. McGraw-Hill.
5. Shari Lawrence Pfleeger. 2001. **Software Engineering: Theory and Practice**. Printice Hall.
6. James Rumbaugh, Ivar Jacobson, and Grady Booch. **The Unified Modeling Technique: Reference Manual**. <http://www.rational.com/uml>.
7. Hans-Erik Eriksson and Magnus Penker. 1998. **UML Toolkit**. John-Wiley and Sons, Inc.
8. Scott w. Ambler. **The Object Primer**. 3rd Edition. University of Cambridge Press. 2004.

Course Title: **Operating Systems**
Course Number: **INTE 441**
Credit Hour: **4**
Prerequisite: **Data Structures and Algorithms Analysis**

Course Description

This course exposes students to the functions, types and internals of operating systems. Topics to be covered include, but not limited to, the overview of operating systems like history, evolution and philosophy. The course then covers the process concept; the thread concept; process scheduling: basic concepts, scheduling criteria, scheduling algorithms; inter-process communication, process synchronization, the critical section problem, semaphores, monitors, classical synchronization problems; deadlocks detection, avoidance, and prevention. Memory management includes physical and virtual memory, swapping, allocation, paging, segmentation; file systems, access methods, directory structure, file system implementation, disk space management, Input/Output, principles of I/O hardware and software; security: authentication and encryption. This course is accompanied by a practical laboratory sessions where students will be exposed to hands-on experience in working on the internals of operating systems, possibly, using a Linux distribution like Ubuntu, Fedora or OpenSuSE.

Course Objectives

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

- describe common inter-process communication and synchronization methods
- grasp common process scheduling algorithms
- understand the problem of deadlocks
- capture the implementation of virtual memory as used in computer systems and some of the critical problems that need to be considered
- describe the main issues of operating systems in handling I/O devices
- explain the goals of file system design and the ways in which several operating systems meet these goals
- discuss the need for security in computer systems in the historical context and discuss several threats and methods of overcoming those threats

Course Content

1. Introduction

- 1.1. what is an Operating system
- 1.2. History of Operating system
- 1.3. Operating System Categories
- 1.4. Operating system concepts (process, files, system calls, shell)
- 1.5. Operating system structures (Monolithic, layered, virtual machines, client/server)

2. Process Management

- 2.1. Process model, implementation of process
- 2.2. Inter - process communication & synchronization
- 2.3. classical IPC problems
- 2.4. Process scheduling

3. Memory Management

- 3.1. Memory management techniques
- 3.2. Virtual Memory
- 3.3. Page Replacement Algorithms

4. I/O Management

- 4.1. Principles of I/O hardware: I/O devices, device controllers, Direct Memory Access
- 4.2. Disk Management: Scheduling algorithms

5. File System Management

- 5.1. File Concepts: naming, structure, types access, attributes, operations
- 5.2. Directories: hierarchies, path names, operations

6. Security and Protection

7. Network Operating Systems

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%

Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Andrew S. Tanenbaum, Modern Operating Systems, 3rd ed., 2007, ISBN-10
0136006633.

References

1. William Stallings, Operating Systems: Internals and Design Principles (5th ed), Prentice Hall, 2005.
2. Abraham Silberschatz, P. B. Galvin and G. Gagne: Operating System Concepts (6th ed), John Wiley & Sons, 2001.
3. Grant Taylor, Linux Complete, 1999, Sybex Inc.
4. Mark J. Rochkind, Advanced Linux Programming, 1995, Prentice Hall
5. Michael Tischer, PC Intern Systems Programming, 1992, Abacus-Developer's Series
6. Christopher Negus, Linux Bible, 2005, Wiley Publishing Inc.,

Course Title: **Computer Graphics**
Course Number: **INTE 455**
Credit Hour: **3**
Prerequisite: **Data Structures and Algorithm Analysis**

Course Description

Computer graphics starts with a brief survey of the main developments. Additional topics include 2D graphics content creation, 2D graphics transformation, 3D graphics content creation and 3D graphics transformation.

Course Objectives

At the end of this course, students will:

- Understand evolution of computer graphics programming
- Develop two-dimensional graphics
- Have an understanding of two dimensional transformations
- Develop three dimensional graphics
- Have an understanding of three dimensional transformations

Course Content

Chapter 1. Overview of Computer Graphics

- 1.1. Evolution of Computer Graphics Programming
- 1.2. Java Programming Language
- 1.3. Java 2D
- 1.4. Java 3D
- 1.5. Related Fields

Chapter 2. 2D Graphics: Basics

- 2.1. 2D Rendering Process
- 2.2. 2D Geometry and Coordinate Systems
- 2.3. The Graphics2D Class
- 2.4. Graphing Equations
- 2.5. Geometric Models
- 2.6. Constructive Area Geometry
- 2.7. General Path

Chapter 3. 2D Graphics: Rendering Details

- 3.1. Colors and Paints
- 3.2. Strokes
- 3.3. Affine Transformation

- 3.4. Compositions of Transformations
- 3.5. Transparency and Compositing Rules
- 3.6. Clipping
- 3.7. Text and Font

Chapter 4. Basic 3D Graphics

- 4.1. 3D Rendering Process
- 4.2. Java 3D API Overview
- 4.3. Java 3D Scene Graphs
- 4.4. The Superstructure
- 4.5. The Nodes
- 4.6. The Node Components
- 4.7. The Structure of a Java 3D Program
- 4.8. Backgrounds and Bounds
- 4.9. Compiling Scene Graphs and Capability Bits

Chapter 5. Graphics Contents

- 5.1. Points and Vectors
- 5.2. Geometry
- 5.3. GeometryInfo
- 5.4. Primitives
- 5.5. Fonts and Texts
- 5.6. Appearance and Attributes

Chapter 6. Geometric Transformation

- 6.1. 3D Affine Transformations
- 6.2. Transformations in Scene Graphs
- 6.3. Composite Transforms
- 6.4. Constructing Geometries with Transformations

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%

Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Shirely, Peter. 2009. Fundamentals of Computer Graphics. 804 p. ISBN-10
1568814698.

References

1. Donald Hearn & Pauline Paker, Computer Graphics, 2nd Ed.,
2. V.K. Pachghare, Comprehensive Computer Graphics, New Delhi,
3. S. Harrington, Computer Graphics A programming Approach, McGraw Hill

Course Title: Introduction to Artificial Intelligence
Course Number: INTE 432
Credit Hour: 3
Prerequisite: Object Oriented Programming, Mathematics I

Course Description

This course introduces basic principles and current research topics in artificial intelligence. It includes a formal representation of real-world problems, search of problem spaces for solutions, and deduction of knowledge in terms of logic and reasoning. Application of these methods is made to important areas of artificial intelligence including Expert Systems, language understanding, machine learning, neural networks, computer vision and robotics.

Course Objectives

On completion of this course students will be able to:

- Describe the key components of the artificial intelligence (AI) field
- Outline search strategies and solve problems by applying a suitable search method
- Grasp how agents reasoning works
- Understand the issues related to agent planning, handling uncertainty, learning from observation and communicate.

Course Content

PART I: PROLOG PROGRAMMING

1. Introduction
2. What is PROLOG
3. Accessing PROLOG
4. Interacting with PROLOG
5. Horn Clauses
6. Queries
7. Negation
8. Arithmetic
9. Declarative and procedure meaning if prolog programs
10. Recursion
11. Lists
 - 11.1 Membership
 - 11.2 Concatenation

- 11.3 Deleting an item
- 11.4 Binary tree
- 11.5 Membership in an ordered binary tree
- 11.6 Inserting an element

PART II. ARTIFICIAL INTELLIGENCE

1. Overview of Artificial Intelligence

- 1.1. History of Artificial Intelligence
- 1.2. Scope of Artificial Intelligence
- 1.3. Method of Artificial Intelligence

2. Production System

- 2.1. Method of inference in production system

3. SEARCH TECHNIQUES

- 3.1. Basic search techniques for graphs (including dynamic backtracking)
- 3.2. Heuristic searching techniques and application of objective functions

4. EXPERT SYSTEM AND THE EXAMPLE OF THEIR APPLICATION

- 4.1. Expert systems and the example of their application
- 4.2. Knowledge Engineering
- 4.3. OPS 5 rule language
- 4.4. Using an expert system shell

5. General Explanation

- 5.1. “How” Explanations
- 5.2. “why” Explanation

6. SEMANTIC NETWORK AND FRAME

- 6.1. Semantic Network
- 6.2. Frame

7. NATURE LANGUAGE PROCESSING

8. PARSING AND DEFINITION CLAUSE GRAMMARS

- 8.1. Parsing
- 8.2. Definition Clause grammars

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%

Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text books:

Stuart J. Russell and Peter Norvig, Artificial Intelligence: Modern Approach (3nd edition), USA, Prentice Hall, 2009, ISBN10: 0136042597.

References

1. James A. Anderson, An Introduction to Neural Networks, 1995, MIT Press. [1]
2. Rich Elaine, Artificial Intelligence, McGraw Hill [0]

Course Title: **Systems and Network Administration**

Course Number: **INTE 442 Same as INSY 442**

Credit Hour: **3**

Prerequisite: **Data Communication and Computer Networks, Operating Systems**

Course Description

This course covers concepts and principles of networked computer systems management and administration. The networked systems may span from simple peer-to-peer networks to complex server-based networked systems and resources. Specific topics include networking fundamentals, server management, network security, network configuration and management. This course provides a practical problem solving approach using any combination of Windows 2003/2008, UNIX/Linux based systems, and Novell Netware systems.

Course Objectives

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

- Manage the day-to-day administrative tasks necessary to maintain a business computer network,
- Create user and group accounts, profiles, and setting permissions,
- Set up and administer a network printer,
- Audit, backup and recovery, and monitoring resources,
- Use software tools such as Microsoft Windows 2003/2008, UNIX/Linux.

Course Content

Chapter 1 Network Operating Systems and Network Communications

- Common Network Operating System Traits
- Network Operating Systems and Hardware Protocols
 - Ethernet
 - AppleTalk
 - Token Ring
 - Token Bus
 - ARCnet
- Network Operating Systems and Networking Protocols
 - NetBIOS
 - NetBEUI
 - IPX/SPX

- TCP/IP

Chapter 2 Microsoft Network Operating Systems

- A Brief History of Microsoft Network Operating Systems
- Common Window Server Administrative Components
 - User Account
 - Group Account
 - Security Policy
 - Network Share
 - Disk Management
 - Administrative Tools
- The Domain Model
- Windows 2000 Server and Windows Server 2003
 - Active Directory
 - Windows 2000/2003 Administration
 - Major Differences in Windows Server 2003
- POSIX
- Interoperability
 - Gateways and Services
 - Microsoft Operating System Client Configuration

Chapter 3 Introduction to the Server

- Server Types and Services
 - Thin Servers
 - Thin Client Servers
 - Server Classification by Number of CPUs
- Major Server Components
 - Case
 - Hot-Swap Components
 - Power Supply
 - Motherboard
 - BIOS
 - Central Processing Unit (CPU)
 - Small Computer Systems Interface (SCSI)
- System Resources

- Interrupt Request (IRQ)
- Direct Memory Access (DMA) Channel 8
- Input/Output (I/O) Port
- Memory Address Assignment
- RAID Systems
- External Storage Systems
 - Network-Attached Storage (NAS)
 - Storage Area Network (SAN)
- Fibre Channel
 - Fibre Channel Point-to-Point Topology
 - Fibre Channel Arbitrated Loop Topology
 - Fibre Channel Fabric Switched Topology

Chapter 4 Network Security

- Hackers, Crackers, and Intruders
- Common Network Security Breaches
 - Unprotected Network Shares
 - Social Engineering
 - Open Ports
 - Zero Configuration (Zerocof)
 - Denial of Service (DoS)
 - Man in the Middle (MITM)
 - Spoofing
 - Trojan Horse
 - E-mail Attachments
 - Macro Virus
 - Worm
 - Phishing
 - Administrator Laziness
- Security Methods and Protocols
 - Encryption
 - Secure Sockets Layer (SSL)
 - Secure HTTP
 - IP Security (IPSec)
 - SSH

- SCP
- Wireless Security
 - Wireless Access Point Authentication
 - Media Access Control (MAC) Filter
 - Wired Equivalency Privacy (WEP)
 - Wi-Fi Protected Access (WPA)
 - Wi-Fi Protected Access 2 (WPA2)
 - 802.11i
 - 802.1x
- Authentication Protocols
 - Password Authentication Protocol (PAP)
 - Challenge Handshake Authentication Protocol (CHAP)
 - Kerberos
- Security Implementations
 - Software Installation Patches
 - Administrator Account
 - User Account Passwords
 - Other Password Security Measures
 - Firewall
 - Packet Filter
 - Application Gateway
 - Circuit-Level Gateways
 - Proxy Server
 - Securing Remote Access
 - Physical Security
- Security Tools
 - Netstat Utility
 - Audit Tools
 - Self-Hack Tools
 - Protocol Analyzer
 - Packet Sniffer
 - System Backups

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

Mark Burgess, Principles of Network and Systems Administration (2nd edition),
2004, ISBN 0-470-86807-4

References

1. Michael Aubert, MCSE Microsoft Windows Server 2003 Active Directory Enhanced, 2006, Thomson Course Tech.
2. Andrew S. Tanenbaum, Computer Networks, 3rd Ed., 1996, Prentice Hall
3. Patrick Ciccarelli & Christina Faulkner, Networking Fundations, 2004, Sybex Inc.
4. Melissia Craft et el., Network+: Exam Prep, 1999, The Coriolis Group
5. John Ray, Using TCP/IP, 1999, Que Corporation
6. William Stallings, Data and Computer Communications, 2004, Prentice Hall.
7. J. F. Kurose and K. W. Ross: Computer Networking: A Top-Down Approach to the Internet (3rd ed), Pearson Education, Inc., 2005.

Course Title: **Computer Maintenance and Technical Support**
Course Number: **INTE 444**
Credit Hour: **3**
Prerequisite: **Introduction to Information Communication Technology**

Course Description

This course is designed to provide students with the fundamentals of configuring, installing, diagnosing, repairing, upgrading, maintaining, computers and their peripherals. The topics include: PC hardware configuration, preventative maintenance, customer interaction, virus protection, safety and networks and installation of operating systems and applications.

Course Objectives

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

- Apply standard safety procedures.
- Correctly operate appropriate tools, equipment, and materials
- Perform periodic maintenance on a computer workstation.
- Demonstrate knowledge of computer components, i.e., power supplies, motherboards, memory, processors, hard drives, modems, and bus and port connections.
- Understand and install appropriate operating systems and drivers.
- Demonstrate knowledge of installation and maintenance of computer peripherals.
- Understand and troubleshoot basic computer networks.
- Manage time and prioritize the needs of the client or organization.

Course Content

Chapter 1: Maintenance Concept

- 1.1 Introduction
- 1.2 Types of maintenance
- 1.3 Proper placement of computer
- 1.4 Safety precautions
- 1.5 Hardware tools

Chapter 2 Preventive Maintenance for Some components

- 2.1 Monitor
- 2.2 Hard disk
- 2.3 Keyboards and pointing devices
- 2.4 printers

2.5 Developing a set of plans and procedures

Chapter 3 Hardware Troubleshooting

3.1 Introduction

3.2 Troubleshooting power supply

3.3 Troubleshooting motherboard

3.4 Troubleshooting CPU

3.5 Troubleshooting RAM

3.6 Troubleshooting other components

Chapter 4 Installing and Troubleshooting Software

4.1 Installing Windows XP

4.2 Installing Microsoft Office

4.3 Troubleshooting the operating system

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Jean Andrews, A+ Guide to Managing and Maintaining Your PC, 6th Edition, Comprehensive, ISBN13: 9780619217587. 2006 edition, ISBN-10 0619217588.

References

1. Stephen J. Bigelow, Troubleshooting, Maintaining, & Repairing PCs, 2nd Ed., 1999, McGraw Hill. [1]
2. David Groth & Dan Newland, A+ Complete Study Guide, 2002, Sybex Inc. [1]
3. Osborne, A+ Certification Study Guide, 3rd Ed., 2001, McGraw Hill. [1]
4. David Groth, A+ Core Module Study Guide, Sybex Inc.

5. Peter Norton & John Goodman, Inside the PC, 7th Ed., 1997, Sams Publishing [1]
6. Tom Badgett et al., A Guide to Operating Systems Troubleshooting & Problem Solving, 1999, Thomson Course Tech. [1]
7. Stephen J. Bigelow, Troubleshooting & Repairing PC Drives & Memory Systems, 2nd Ed., 1998, McGraw Hill. [1]
8. Will Train, PC Upgrading & Maintenance, 1997, Sybex Inc. [1]
9. Beisse, A Guide to Computer User Support for Help Desk and Support Specialists, 3rd ed., 2001, Course Technology, ISBN 0-619-21510-0

Course Title: Wireless Communications and Mobile Computing

Course Number: INTE 446

Credit Hour: 3

Prerequisite: Data Communication and Computer Networks

Course Description

This course on wireless communication includes an overview of current wireless systems; wireless channel and system models; cellular communications, multiple access schemes and wireless communication systems standards (1G/2G/3G systems). Topics on Mobile Computing include an introduction to mobile computing, mobile devices, and trends of mobile computing, mobile communication protocols and mobile operating systems.

Course Objectives

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

- Explain principles of current wireless systems.
- Understand wireless channel and system models.
- Grasp mobile devices and their computing.

Course Content

Chapter 1 Wireless Communication

1. Overview of current wireless systems;
2. Wireless channel and system models;
3. Cellular communications
4. Multiple access schemes: FDMA, TDMA, CDMA,
5. Wireless communication systems standards (1G/2G/3G systems),
6. Topologies of cellular and ad-hoc networks;

Chapter 2 Mobile Computing

1. Introduction to mobile computing;
2. Mobile devices and trends of mobile computing;
3. Mobile communication protocols;
4. Mobile operating systems;
5. Application development for mobile devices,
 - 5.1 Intro to the Mobile Web
 - 5.2 W3C Standards, Device Recognition
 - 5.3 Mobile Web Design Tools
 - 5.4 Introduction to Mobile Python

5.5 Introduction to Java and MIDP2.0

5.6 Application Development and Deployment

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1.....	10%
Test 2.....	10%
Assignments.....	20%
Assignment I.....	10%
Assignment II.....	10%
Lab Exercise	20%
Final exam	40%
Total.....	100%

Text Book

1. P. Zheng et al., Wireless Networking Complete, 2009, 300 pages, ISBN-10: 0123750776
2. Reza B'Far, Roy T. Fielding, Mobile Computing Principles: Designing and Developing
3. Mobile Applications with UML and XML, Cambridge University Press, 2005, ISBN 0521817331, 9780521817332

References

1. T. S. Rappaport, Wireless Communications: Principles & Practice(2nd ed), USA, Prentice-Hall: Upper Saddle River, 2002
2. The Essential Guide to the Business of U.S. Mobile Wireless Communications, John P. Burnham, 2002, Prentice Hall
3. Tse David & Pramod Viswanath, Fundamentals of Wireless Communication

Course Title: Web Technologies
Course Number: INTE 452
Credit Hour: 3
Prerequisite: Internet Programming II

Course Description

This course exposes students, beyond designing websites, to the prominent technologies and standards being used on the web. Representative topics to be covered include introduction to web standards, transformations of XML documents, programming language bindings, introduction to web technologies for e-commerce and online payments; advanced web services and associated standards.

Course Objectives

At the end of the course, the students will:

- know the important technologies and standards currently used on the web,
- Be able to use the web for accessing relevant information,
- Understand web services

Course Content

Chapter 1 XML

- 1.1 Introduction
- 1.2 XML Basics
- 1.3 Structuring Data
- 1.4 XML Namespaces
- 1.5 Document Type Definitions (DTDs)
- 1.6 W3C XML Schema Documents
- 1.7 XML Vocabularies
- 1.8 Extensible Stylesheet Language and XSL Transformations
- 1.9 Document Object Model (DOM)

2 Ajax-Enabled Rich Internet Applications with XML and JSON

- 2.1 Introduction
- 2.2 Rich Internet Applications (RIAs) with Ajax
- 2.3 History of Ajax
- 2.4 “Raw” Ajax Example Using the XMLHttpRequest Object
- 2.5 Using XML and the DOM
- 2.6 Creating a Full-Scale Ajax-Enabled Application

3 Web Services in C#

- 3.1 Introduction
- 3.2 WCF Services Basics
- 3.3 Simple Object Access Protocol (SOAP)
- 3.3 Representational State Transfer (REST)
- 3.5 JavaScript Object Notation (JSON)
- 3.6 Publishing and Consuming SOAP-Based WCF Web Services
- 3.7 Publishing and Consuming REST-Based XML Web Services
- 3.8 Publishing and Consuming REST-Based JSON Web Services
- 3.9 Blackjack Web Service: Using Session Tracking in a SOAP-Based WCF Web Service
- 3.10 Airline Reservation Web Service: Database Access and Invoking a Service from ASP.NET 823
- 3.11 Equation Generator: Returning User-Defined Types

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Paul Dietel, Internet & World Wide Web: How to Program, 5th Edition, 2011,

References

1. Jeffrey C. Jackson. 2006. Web Technologies: A Computer Science Perspective, Prentice Hall. ISBN-10 0131856030. 574 p.
2. Mark Arnold et el., Administering Apache, 2000, McGraw Hill
3. Ajay Vohra & Deepak Vohra, Pro XML Development with Java Technology, APress

4. Roger Jennings, Visual Basic.NET XML Web Services, 2002, McGraw Hill
5. Peter den Haan et al., Beginning JSP 2: From Novice to Professional, 2004, APress
6. Chris Goode et al., Beginning ASP.NET 1.0 with Visual Basic.NET, 2002, Wrox Press Ltd.

Course Title: IT Project Management
Course Number: INTE 460
Credit Hour: 3
Prerequisite: Structured Systems Analysis and Design

Course Description

The purpose of this course is to provide students with practical experience in the management of development projects. It deals with planning, organizing, staffing, controlling, and directing projects. It puts major emphasis on project planning, techniques for monitoring and controlling projects, quantitative methods and tools, and leadership issues in project management. A term project that involves the development of a project plan for a non-trivial project will be required. Students will gain experience by establishing and actively participating in a development team that comprises of both IS and IT students. Each team will have approximately an equal number of IS and IT students.

Course Objectives

At the completion of the course the student will be able to:

- Define a project goal and create the project charter
- Create a feasibility plan and establish a priority list
- Determine strategy and budget
- Work with management and define their role
- Determine project expenses - including estimated required hours
- Delegate responsibilities and manage project schedules
- Implement a project management approach to tracking progress and implementing
- Develop a project management system to track costs and schedule quality testing

Course Content

Chapter One: Project Management Framework

- Introduction to Project
- Introduction to Project Management
- Project phases,
- Project Stakeholders

Chapter Two: Integration management

- Develop Project Charter
- Develop Preliminary Project Scope Statement
- Develop Project Management Plan

- Direct and Manage Project Execution
- Scope management
- Monitor and Control Project Work
- Integrated Change Control
- Close Project
- Scope Planning
- Scope Definition

Chapter Three: Scope management

- Create WBS
- Scope Verification
- Scope Control

Chapter Four: Time management

- Activity Definition
- Activity Sequencing
- Activity Resource Estimating
- Activity Duration Estimating
- Schedule Development
- Schedule Control

Chapter Five: Cost management

- Cost Estimating
- Cost Budgeting
- Cost Control

Chapter Six: Quality management

- Quality Planning
- Perform Quality Assurance
- Perform Quality Control

Chapter Seven: Human resource and Communication management

- Human Resource Planning
- Acquire Project Team
- Develop Project Team
- Manage Project Team
- Communications Planning
- Information Distribution
- Performance Reporting

- Manage Stakeholders
- Risk Management Planning

Chapter Eight: Risk management

- Risk Identification
- Qualitative Risk Analysis
- Quantitative Risk Analysis
- Risk Response Planning

Chapter Nine: Risk management Procurement management

- Risk Monitoring and Control
- Plan Purchases and Acquisitions
- Plan Contracting
- Request Seller Responses
- Select Sellers
- Contract Administration
- Contract Closure

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Course Project	20%
Final exam	40%
Total	100%

Text Book

Jack R. Meredith, Scott M. Shafer, Sutton, Margaret Sutton, Information Systems Project Management, 2007, ISBN-10 0975914650

References

1. Phillips, Joseph, IT Project Management: On Track from Start to Finish, 2nd edition, 2004, McGraw Hill, Osborne.

2. Bainey, Kenneth R. 2004. Integrated IT Project Management- A Model-Centric Approach. Artech House, Boston.
3. Lock, Dennis. 2007. Project Management, 9th ed. Gower.

Course Title: Internship
Course Number: INTE 462
Credit Hour: 3
Prerequisite: Completing Third Year

Course description

This course supplements the student's academic program with experiential education. The internship experience will be guided by a learning contract outlining expectations and academic components. The internship will occur during the summer break between the third and fourth year. The intern will work regular work days for two and a half months. Students are expected to concentrate on the major ICT areas of the organization they are engaged during their attachment.

Course Objectives

During the time of the internship students are expected to fully engage themselves with all aspects of the organizational ICT infrastructures, systems and services including but not limited to:

- Legacy systems (both hardware and software) being used, migrations from old to modern systems (if any), etc
- How organizations manage their ICT needs and requirements
- Network systems being used and maintained, technologies(both hardware and software) used, services delivered, etc
- Operating systems and other software tools used
- The strategy deployed to respond organizational software needs
- Web systems and technologies being used
- Users expectations and satisfactions of the ICT services
- How end users' requests are managed
- Detailed knowledge of organizational ICT infrastructures and strategies
- New ways of doing things in ICT

The intern is expected to be effortful and successful in establishing all-rounded personality addressing the aforementioned areas and they are encouraged to find a specific area of interest and explore more deeply. For instance, after exploring the overall ICT infrastructures and systems of an organization a student may become more interested concentrate his/her effort either in the networking systems or software development or web development and services of the organization.

Course Content

None

Method of Teaching

- None

Assessment

Daily reports and accomplishments	40%
Special project accomplished and report delivered	40%
Executive interview (viva voce)	10%
Job performance evaluation	10%
Total	100%

Text books:

None

References

None

Course Title: Human Computer Interaction
Course Number: INTE 533
Credit Hour: 3
Prerequisite: General Psychology, Introduction to Information
Communication Technology

Course Description

This course describes the human psychological response of computer system users. Topics include cognitive principles and their application to interfaces with computer products. The course presents analysis of human interaction with products such as avoidance and feedback that show the behavior of user populations that differ with regard to their abilities and characteristics in using both software and hardware products. The importance of the user abilities and characteristics in the usability of products are covered. The course is backed up by a series of laboratory sessions.

Course objectives

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

- Explain cognitive principles and their applications
- Cognize the conceptual terms for analyzing human interaction with products
- Understand theories and principles of human computer interaction
- Internalize the capabilities of users, and
- Design and develop technologies that fit the organization and work practices.

Course Content

Chapter One: Introduction

- Interaction
- Human machine Interface
- Human Interface Devices
- Human System Interaction
- Human Computer Interaction(HCI)
- HCI vs CHI
- User friendliness
- Interaction Technique and tasks
- Interaction Styles
- Interaction Paradigms
- Interaction devices & Input and output Devices
- Field of HCI

- Likely Future developments
- The Contents of Human-Computer Interaction
- Nature of Human-Computer Interaction
- Application Areas
- Goals and Aspect of HCI
- HCI is Science or Art
- The HCI Group

Chapter Two: User Interface

- The term interface
- Good and Bad Interfaces
- What should be Considered in a Good Interface
- Feature of a Good Interface
- User Interface
- Document Interface and their Types
- Example Programs
- User Interface Software and Tools

Chapter Three: WIMP

- Definition
- Alternative Expansion

Chapter Four: Designing Use Interface

- Introduction
- Importance of User Interface Design
- The Role of Interface Designer
- Principles of User Interface Design
- The Eight Golden Rules of Interface Design
- User Interface Models
- Designing an Interface
- Design Methodologies
- Efficacy of User Interface Design
- User Interface Design
- The Dialog

Chapter Five: Development and Evaluation of User Interface

- User-Centered Design(UCD)
- Factor in Interface Design

- HCI Design Models
- Task Analysis
- Design Cycle
- Need for Evaluation of Interface
- The process of Interface analysis
- Documentation
- User Documentation Handbook of Human-Computer Interaction by Martin Helander, Thomas Landauer, Prasad Prabhu. Amsterdam: North-Holland

Chapter Six: Ergonomics

- Definition
- Types of Ergonomics
- Physical Ergonomics
- Cognitive Ergonomics
- Ergonomics of Computer Use

Chapter Seven: Usability

- Introduction
- Usability Engineering
- Usability Acceptability
- How to Achieve High Level Usability
- Usability Goals
- The usability Engineering Life Cycle
- What to Measure in Usability Testing
- Usability Evaluation and Testing
- Learnability
- Flexibility

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1.....	10%
Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%

Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

Jennifer Preece, Yvonne Rogers, Helen Sharp, Interaction Design: Beyond Human-Computer Interaction, 2e., ISBN-13: 978-0-470-01866-8 (ISBN-10: 0-470-01866-6), Paperback, 800 pages, 2007.

References

1. Human-Computer Interaction (3rd Ed): by Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale
2. Holtzblatt, K., Wendell, J. B., and Wood, S. (2004). Rapid Contextual design: A How-to Guide to key techniques for user-centered design, Morgan Kaufmann

Course Title: Network Device Configuration and Troubleshooting

Course Number: INTE 541

Credit Hour: 4

Prerequisite: Data Communications and Computer Networks

Course Description

This course is directed towards designing a network and troubleshooting network problems and fixing them. Topics include the functions of networking, security, the Host-to-Host communications model, packet delivery process, connecting to an Ethernet LAN, solving network challenges with switched LAN technology, switches, routers, remote devices, IP addressing schemes and IP services to meet network requirements for a small branch office. The practical side of this course is directed towards working with network hardware. Topics include configuring and troubleshooting switches, routers, remote devices, IP addressing schemes and IP services. Students will assemble the system, operate it, and perform troubleshooting and maintenance.

Course Objectives

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

- Set up the basic configurations for switches and routers as applied to LANs and WANs
- Formulate basic access control lists to provide security for a network
- Perform basic troubleshooting of typical network problems
- Design a simple LANs and wans using cisco devices
- Setup IP sub-networks with appropriate IP addresses and subnet masks
- Set up operate the hardware for basic configurations for switches and routers as applied to LANs and WANs
- Carryout basic troubleshooting and maintenance of typical network problems
- Understand remote monitoring and maintenance.

Course Content

Chapter 1 TCP/IP Fundamentals

- IP Addressing
 - Network Class
 - Subnet Mask
 - Reserved IP Addresses
 - Viewing IP Configuration Settings

- Domain Name System (DNS)
 - Internet Corporation for Assigned Names and Numbers (ICANN)
 - Fully Qualified Domain Name (FQDN)
 - DNS Structure and Operation
 - Hosts and Lmhosts Text Files
- The IP, TCP, and UDP Protocols
 - Relationship to the OSI Model
 - Frame Formats
- Assigning IP Addresses
 - Windows Internet Naming Service (WINS)
 - Dynamic Host Configuration Protocol (DHCP)
 - DHCP Lease
 - Automatic Private IP Addressing (APIPA)
 - Bootstrap Protocol (BOOTP)
- TCP/IP Ports and Sockets
- TCP/IP Troubleshooting Utilities
 - Netstat
 - Ntstat
 - Ping
 - Tracert or Traceroute
 - ARP
 - Nslookup
- The IPv6 Standard
 - Loopback Address
 - IPv6 MAC Address

Chapter 2 Subnetting

- The Binary Number System
- Dotted Decimal Notation
- Subnetting
 - A Closer Look at Subnets
 - Advantages of Subnetting
 - Disadvantages of Subnetting
- Virtual LAN (VLAN) Preventive Maintenance

Chapter 3 Fundamentals of Troubleshooting the Network

- Troubleshooting Procedures
- Troubleshooting the Network Infrastructure
 - Windows XP Network Diagnostic Utility
 - Network Cable Tester
 - Tone Generator and Tracer
 - Fiber-Optic Cables
 - NIC Loopback Test
 - Indicator Lights
 - Network Analyzers
 - Protocol Analyzer
 - Wireless Network Tester/Analyzer
- Troubleshooting the Server
- Troubleshooting the Most Common Network Problems
 - The User Cannot Log On to the Network/Computer
 - Loose Connections
 - The User Cannot Access a Share
 - The user Cannot Print to the Network Printer
 - The Printer is Printing Gibberish
 - The User Cannot Access the Internet
 - The User's Computer Has a Virus or Worm
 - Troubleshooting with Event Viewer and System Monitor
- Troubleshooting with TCP/IP Utilities
 - Ping
 - Tracert
 - Netstat
 - Ntstat
 - ARP
 - Ipconfig
 - Nslookup

Chapter 4 Designing and Installing a New Network

- Needs Assessment and Design
 - Physical Network Structure
 - Security

- Application
- Organizational Structure
- Fault Tolerance and Data Integrity
- Network Design Tools
- Developing a Timeline
- Installation
- Implementation
- Documentation
- Training
- Specifications for Network Design
 - Architectural Design Elements
 - Standards Organizations
 - ANSI/TIA/EIA Standards
 - Network and Computer Electrical Requirements
- BICSI

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Books

- Peterson L. L. and B S Davie. 2007. Computer Networks: A Systems Approach, 4th edition. 848 p. ISBN-10 0123705487.

References

- Network device manuals
- Todd Lammle, CCNA Study Guide, 4th Ed., Sybex Inc.

- Todd Lammle, CCNA Study Guide, 2nd Ed., Sybex Inc.

Course Title: **Multimedia Systems**
Course Number: **INTE 557**
Credit Hour: **3**
Prerequisite: **Data Structures and Algorithm Analysis**

Course Description

Multimedia data has become an indispensable part of our daily life. It is also one of the most critical applications in broad areas of use. In this course students will be introduced to the principles and current technologies of multimedia systems. The course includes the topics introduction to multimedia and multimedia systems, multimedia data representation, multimedia applications, multimedia tools, hands on practice on multimedia system creation using tools, multimedia standards, communication requirements of multimedia data and multimedia information retrieval.

Course Objectives

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

- Understand principles and current technologies of multimedia systems,
- Comprehend applications of multimedia systems in day-to-day life
- Design and develop electrifying multimedia rich contents for various application domains like web sites and databases

Course Content

CHAPTER 1: INTRODUCTION

1.1. History of Multimedia Systems

1.2. Hypermedia/Multimedia

1.2.1. What is Hyper Text and Hypermedia?

1.2.2. What is Multimedia?

1.3. Overview of Multimedia Software Tools

1.3.1. Music Sequencing and Notation

1.3.2. Graphics, Image and Video Editing

1.3.3. Multimedia Authoring

CHAPTER 2: ISSUES IN MULTIMEDIA AUTHORING

2.1. Multimedia Authoring Metaphors

2.2. Content Design

2.2.1. Scripting (Writing)

2.2.2. Graphics (Illustrating)

- 2.2.3. Animation (Wiggling)
- 2.2.4. Audio (Hearing)
- 2.2.5. Interactivity (Interacting)

2.3. Visual Design

2.4. Technical Design

CHAPTER 3: MULTIMEDIA DATA REPRESENTATIONS

3.1. Basics of Digital Audio

- 3.1.1. Digitization of Sound
- 3.1.2. Introduction to MIDI (musical Instrument Digital Interface)

3.2. Graphic/Image File Formats

- 3.2.1. Graphic/Image Data Structures
- 3.2.2. Standard System Independent formats
- 3.2.3. System Dependent Formats

3.3. Color in Image and Video

- 3.3.1. Basics of Color
- 3.3.2. Color Models in Images
- 3.3.3. Color Models in Video

3.4. Basics of Video

- 3.4.1. Types of Color Video Signals
- 3.4.2. Analog Video
- 3.4.3. Digital Video

CHAPTER 4: VIDEO AND AUDIO COMPRESSION

4.1 Lossless Compression Algorithms

- 4.1.1. Basics of Information Theory
- 4.1.2. Huffman Coding
- 4.1.3. Adaptive Huffman Coding
- 4.1.4. Lempel-Ziv-Welch Algorithm

4.2. Image Compression—JPEG

- 4.2.1. Overview of JPEG
- 4.2.2. Major Steps
- 4.2.3. A Glance of the JPEG Bitstream
- 4.2.4. Four JPEG Modes
- 4.2.5. JPEG 2000

4.3. Video Compression

4.3.1. H.261

4.3.2. H. 263

4.3.3. MPEG

4.3.4. Newer MPEG Standards

4.4. Audio Compression

4.4.1. Simple Audio Compression Methods

4.4.2. Psychoacoustics

4.4.3. MPEG Audio Compression

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Suzanne, Jennifer, et al., Multimedia Basics, 2004, Thomson Course Tech.

References

1. Tay Vaughan. 2006. Multimedia: Making it Work, 7th ed. ISBN-10 0072264517.
2. Ralf Steinmetz and Klara Nahrstedt, Multimedia Fundamentals: Media Coding and Content Processing; Prentice Hall,
3. Ze Nian Li and M. S. Drew, Fundamentals of Multimedia, Prentice Hall, 2004.
4. G. Lu, Multimedia Database Management Systems, 1999, Artech House [0]
5. K.R. Rao et al., Multimedia Communication Systems, 2002, Prentice Hall

Course Title: Senior Project I
Course Number: INTE 565
Credit Hour: 3
Prerequisite: Internet Programming II, Advanced Database Management Systems, Object Oriented Software Engineering

Course Description

The aim of this project is to develop ability to prepare the system requirement specification document for an information technology project. The purpose of this project is for students to practice what they have learned in classes from different courses by applying in a specific project they select. The student will select a topic in an application area, which must be approved by the Department of Information Technology, and write a project plan and then carry out the project from planning to Design. The deliverables produced in this course are a proposal and analysis document. To accomplish this, students will be organized in teams and assigned an advisor who mentors them throughout the project and guides them to successful completion. Evaluation will be conducted by a panel of instructors which will comprise of the advisor and examiners.

Course Objectives

The project gives students the opportunity to obtain, develop and demonstrate research skills in Information Systems

- Gather requirements using different requirement gathering methods
- Analyze and organize the requirements gathered
- Designing a solution for those needs
- Produce proposal for new system
- Produce model of the new system using standard modeling tools
- Communicate and negotiate with the organization to convince the importance of the new system
- Communicating efficiently within the group
- Organizing work / programming within a group
- An ability to identify and analyze user needs

Course Content

None

Method of Teaching

- Advising

Assessment

- Progress reports evaluation by the advisor 20%
- Documentation 40 %
- Presentation 20%
- Questions answering 20%

Text books:

None

References

None

Course Title: Information and Society

Course Number: INTE 504

Credit Hour: 3

Prerequisite: Introduction to Information and Communication Technology

Course Description

This course covers information, information overload, computers and their use, the social system and societal evolution. Topics include social impacts of information, physiological, psychological, cultural, and social interactions; the information economy (occupational changes, impacts on the work force, telecommuting), information economics (market structure and pricing, etc), e-governance (computerization and democratization), computer crimes and security mechanisms, property rights, privacy, surveillance, and censorship. Moreover, issues regarding regulation, the digital divide and ethics of computing professional will be discussed.

Course Objectives

Through this course students will be able to:

- Comprehend the impact of information on society
- Understand e-governance
- Conceptualize and use ergonomics of computers
- Recognize ethical issues regarding information technology and adhere to the same

Course Content

Chapter 1 Basic Concepts

- ✚ Data, Information, Knowledge, Wisdom, and Information Hierarchies
- ✚ Information Societies and Information Sectors
- ✚ Information Theory
- ✚ Cybernetics and Entropy
- ✚ Information Overload
- ✚ Social System
- ✚ Information Demand and Human Evolution
- ✚ Economical aspects of Information Society
- ✚ Globalization
- ✚ Information rich Vs. information poor Society

Chapter 2 The Physiological, Psychological, SOCIAL impacts of computer USE

- ✚ Technology and Human needs

- ✚ Ergonomics
- ✚ The Physiology of Human/Computer Interaction
- ✚ The Psychology of Human/Computer Interaction
- ✚ Social Interactions among Computer Users
- ✚ Computer Aided Conversation and The problem of Trust
- ✚ Social Integration in Electronic Networks
- ✚ Changes caused by Computer Technology Application to Work

Chapter 3 The Information economy: from manufacturing to knowledge production

- ✚ Introduction
- ✚ The Social Structure of Work
- ✚ Industrial Change in the Information Society

Chapter 4 Information property, privacy, and control

- ✚ Information as property
- ✚ Protecting Information Products
- ✚ Intellectual property in Ethiopian Case
- ✚ Computer Crime
- ✚ Computer Security
 - Computer Security Measures
- ✚ Privacy Issues vis-à-vis ICT
- ✚ Information Policy
- ✚ Political aspect of Information society

Chapter 5 Ethics in an information society Information Society

- ✚ Basic Concepts: Responsibility, Accountability, and liability
- ✚ Ethical Analysis
- ✚ Candidate Ethical principles
- ✚ The Moral Dimensions of Information Systems
- ✚ Information Rights: Privacy and Freedom in a Information Society
- ✚ Property Rights: Intellectual Property
- ✚ Accountability, Liability and Control

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests30%

Test 1.....	10%
Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

M. Martin and R. Schinzinger, Introduction to Engineering Ethics, 2009, 288 pages,
ISBN-10: 0072483113

References

1. Accreditation Board for Engineering and Technology (ABET) Engineering Criteria 2000 Third Edition,<http://www.ele.uri.edu/People/Faculty/daly/criteria.2000.html>
2. <http://www.acm.org/constitution/code.html> ACM Code of Ethics & Profess. Conduct
3. www.ieee.org/about/whatis/code.html IEEE Code of Ethics
4. Fuchs, Christian. 2008. Internet and society: social theory in the information age. Routledge, New York

Course Title: UNIX System Administration and Support

Course Number: INTE 540

Credit Hour: 3

Prerequisite: Operating Systems

Course description

This course is designed to introduce the students how to perform basic and advanced systems administrative tasks on UNIX environments with the intention of enabling them to have the skills to manage users, services, files, hardware devices and networks. Topics covered includes but not limited to installation and configuration of a UNIX based operating system, maintenance and monitoring of files systems, managing users; monitoring and troubleshooting system performance, developing and customizing user login and other start-up scripts; managing system services, shell scripting, automating system services. Installing and updating application software , connecting to an network, implementing file servers, print servers and web server, mail servers, security administration, firewalls and IP masquerading, system backups and restores, and package and patch administration.

Course Objectives

Upon successful completion of this course, students will be able to:

- Describe, define and understand the open and free software principles and mottos
- Understand the various UNIX and Linux based operating system distributions
- Install and configure a Linux-based operating system
- Use and manage the installed and configured operating system
- Monitor and fine tune performances of typical operating system features
- Manage users and other resources in the operating system, possibly on a networked system
- Install, configure and test file, mail, print and web servers
- Perform security related configurations and patch updates
- Perform system backups and restores

Course Content

Chapter 1 Installation and configuration of an UNIX operating system

- ◆ Maintenance and monitoring of file systems
- ◆ Managing users
- ◆ Monitoring and troubleshooting system performance

- ◆ Developing and customizing user login and other start-up scripts

Chapter 2 Managing system services

- ◆ Shell scripting
- ◆ Automating system services
- ◆ Installing and updating application software

Chapter 3 Networking

- ◆ Connecting to a network
- ◆ Implementing file servers, printer servers and web servers, mail servers,

Chapter 4 Security Administration

- ◆ Firewalls and IP masquerading
- ◆ System backups and restores
- ◆ Package and patch administration.

Chapter 5 Writing Good GNU/Linux Software

- ◆ Editing with Emacs
- ◆ Compiling with GCC
- ◆ Automating the Process with GNU Make
- ◆ Debugging with GNU Debugger (GDB)
- ◆ Finding More Information
- ◆ Interaction With the Execution
- ◆ Environment
- ◆ Coding Defensively
- ◆ Writing and Using Libraries

Chapter 6 Processes

- ◆ Looking at Processes
- ◆ Creating Processes
- ◆ Signals
- ◆ Process Termination

Chapter 7 Threads

- ◆ Thread Creation
- ◆ Thread Cancellation
- ◆ Thread-Specific Data
- ◆ Synchronization and Critical Sections

- ◆ GNU/Linux Thread Implementation
- ◆ Processes vs. Threads

Chapter 8 Interprocess Communication

- ◆ Shared Memory
- ◆ Processes Semaphores
- ◆ Mapped Memory
- ◆ Pipes
- ◆ Sockets

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Evi Nemeth, Gareth Snyder et al., UNIX System Administration Handbook, 3rd Ed.,
2001, Prentice Hall

References

1. Dave Taylor, Sams Teach Yourself UNIX System Administration in 24 Hours,
Sams Publishing
2. David Tansley, Linux and UNIX Shell Programming
3. Mark Burgess, Principles of Network and System Administration

Course Title: Information Assurance and Security
Course Number: INTE 564
Credit Hour: 3
Prerequisite: Systems and Network Administration, and Advanced Database Management Systems

Course Description

The course will cover historical background of security, fundamentals of Information Systems security, privacy and the importance of security for Information Systems. Additional topics include protection schemes, public and private key encryption techniques, and security at different layers, malicious security threats (viruses, worms, trojan horses) and web security.

Course Objectives

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

- Understand potential threats of information systems
- Comprehend theories and principles of information security
- Plan security protection mechanisms and analyze their strength and limitations
- Demonstrate how to secure computer resources and control users accesses

Course Content

Chapter One: Threats That Impact Security

- Hackers
- Eavesdropping
- Spoofing
- Sniffing
- Trojan Horses
- Viruses
- Wiretaps

Chapter Two: Overview of Applied Cryptography for Privacy and Security

- Basic applied cryptography
- Various authentication methods

Chapter Three: Securing Information Systems

- Analyzing Security vulnerabilities
- Encrypting documents for confidentiality
- Hardening the information system
- System backup and recovery

- Securing the organization's network

Chapter Four: Analyzing network vulnerabilities

- Various prevention and protection techniques

Chapter Five: Intrusion detection systems

- Network-based intrusion detection systems
- Host-based intrusion detection systems
- IDS Signatures and Analysis
- Introduction to existing IDS
- IDS Selection and Evaluation Process

Chapter Six: IAS management in an organization

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%
Test 3	10%
Assignments	30%
Assignment I	10%
Assignment II	10%
Assignment III	10%
Final exam	40%
Total	100%

Text Book

Ciampa. 2009. Security Awareness: Applying Practical Security in Your World, ISBN-10: 1435454146.

References

1. S. Bosworth and M. E. Kabay, Computer Security Handbook (4th ed) , Willey Inc. , 2002.
2. D. Schweitzer, Incident Response, Computer Forensics Toolkit, Wiley, 2003.
3. S. Garfinkel, G. Spafford and A. Schwartz, Practical Unix and Internet Security (3rd ed), O'Reilly, 2003.

Course Title: Senior Project II

Course Number: INTE 566

Credit Hour: 3

Prerequisite: Senior Project I

Course Description

This course is a continuation from Senior Project I, the course is totally based on what the students have done in Senior I of the course. In this course, students continue to progress in the project and produce an implementation documents. They are expected to implement the system and test if it works properly as per the design. In implementation, they write a code (in any language) for the application, create databases, produce different types of reports, create computer networks, and implement client server systems depending on their project type. This course is aimed at helping students build up an understanding of how to develop a software system from scratch by guiding them through the development process and giving them the fundamental principles of system development

Course Objectives

The project gives students the opportunity to obtain, develop and demonstrate software development skills.

- Write applications to simplify information processing form organization
- Design organizational IT systems including databases systems, computer networks, and web systems
- Apply different software testing techniques and methods
- Work in a team to develop information systems
 - Communicating efficiently within a group
 - Understanding coding

Course Content

- None

Method of Teaching

- Advising

Assessment:

- | | |
|---|------|
| ◆ Progress reports evaluation by the advisor | 20% |
| ◆ Functionality and nonfunctional features of the prototype | 40 % |
| ◆ Demonstration | 20% |

◆ Questions answering

20%

Text books:

None

References

None

19.2 Major Elective Courses

Course Title: Formal Language Theory

Course Number: INTE 511

Credit Hour: 3

Prerequisite: Advanced Programming, Mathematics II

Course Description

This course focuses on grammars and automata: regular grammars and finite state automata; context-free grammars and pushdown automata. It covers foundation concepts and theory on how artificial languages are designed and work.

Course Objectives

Upon the completion of this course, students will be able to understand:

- Regular grammars and languages;
- Deterministic and non-deterministic finite state automata (DFSA and NFSA) and their relationships with regular languages;
- Regular expressions and their properties;
- Equivalent among the DFSA, NFSA and regular expressions;
- Context free grammars and languages;
- Pushdown automata and their properties and relationships with context free languages.

Course Content

Chapter 1: Basics

1. 1 Overview of languages: natural vs formal
1. 2 Review of set theory and relations
 - 1 2.1 Set theory
 - 1.2.2 Relations and functions
1. 3 Mathematical induction
- 1.4 Graphs and trees
 1. 4.1 Graphs
 1. 4.2 Trees
- 1.5 Strings and languages
 - 1.5.1 Strings
 - 1.5.2 Languages

Chapter 2: Introduction to grammars

- 2.1 Grammars (introduction)
- 2.2 Phrase Structure Grammar (PSG) and language
 - 2.2.1 Derivation

Chapter 3: Regular languages

- 3.1 Regular grammars
 - 3.1.1 Regular grammars (introduction and definition)
 - 3.1.2 Regular languages and properties
 - 3.1.3 Transition diagrams
- 3.2 Automata
 - 3.2.1 Characteristics and types of automata
 - 3.2.2 Finite State Automata (FSA)
- 3.3 Regular expressions (REs)
 - 3.1 identities for regular expressions
 - 3.2 equivalence of DFSA, NFSAs, and RE
- 3.4 Minimization of DFSA
 - 3.4.1 Construction of minimal DFSA
- 3.5 Identification of non-regular languages
 - 3.5.1 Pumping lemma for regular languages

Chapter 4: Context Free Languages

- 4.1 Context Free Grammars
- 4.2 Parsing arithmetic expressions
- 4.3 Removing lambda productions
- 4.4 Normal Forms (NFs)
- 4.5 A membership algorithm for CFGs (CYK algorithm)

Chapter 5: Push Down Automata

- 5.1 Non-deterministic pushdown automata (NPDA)
- 5.2 Deterministic pushdown automata (DPDA)

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%

Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

Peter Linz, An Introduction to Formal Language Automata, D.C. Heath, 1990.

References

1. Herbert L. D. & Michael J. J, Programming Languages: Structures & Models, 2nd Ed., 1995, PWS Publishing
2. Robert W. Sebesta, Concepts of Programming Languages, 4th Ed., 1999, Addison Wesley Inc.
3. K.L.P Mishra, Theory of Computer Science, Prentice Hall Inc., 2003.
4. John C. Martin, Introduction to Language and the Theory of Computation, Tata McGraw Hill, 2004.

Course Title: Introduction to Compiler Design
Course Number: INTE 513
Credit Hour: 3
Prerequisite: Data Structures and Algorithm Analysis

Course Description

This is a course for those who are interested in the design and practice of programming languages. A compiler enables us to use a high-level programming language like C or Java by translating programs into low-level machine code. Understanding how compilers work is essential if you want to be a good programmer. The study of compilers also includes interesting ideas in translation and optimization with sparse resources. To be specific, the course covers an overview of a compiler, Lexical Analysis: regular expressions and finite-state machines, Simple Parsing: context-free grammars, top-down and bottom-up parsing, LL(1) parsing: efficient top-down parsing, Shift-reduce parsers: introduction to bottom-up parsing, SLR/LR parsing: fast and efficient bottom-up parsing, Type checking: checking semantics of program, Semantics and code generation: from a high-level language to assembly language, optimization: an introduction to various types of code optimization.

Course Objectives

At the completion of this subject, students will:

- Understand the purpose and workings of compilers
- Explain how compilers make translations
- Comprehend how syntax and semantic checking works
- Use lexical analysis on regular expressions
- Use lexical analysis and parsing tools
- Knowledge of how to design a compiler

Course Content

Chapter-1: Introduction

- 1.1 Compiler and its various phases
- 1.2 Cousins of Compiler
- 1.3 The Grouping of Phases AND Compiler Construction Tools

Chapter-2: Lexical Analysis

- 2.1 Functions of Lexical Analysis AND Role of the Lexical Analyzer
- 2.2 Input Buffering

2.3 Specification of tokens AND Recognition of tokens

Chapter-3: Syntax Analysis

3.1 The Role of the Parser

3.2 Context Free Grammars

3.3 Regular Expressions vs. Context Free Grammars

3.4 Predictive Parsing

3.5 Operator Precedence Parsing

3.6 LR Parsers

Chapter-4: Syntax directed Translation

4.1 Syntax directed definitions

4.2 Construction of syntax trees

4.3 Bottom-up evaluation of S-attributed definitions

4.4 L-attributed definitions

Chapter-5: Symbol Tables & Type Checking

5.1 Symbol Tables

5.2 Type Systems

5.3 Specification of a simple type checker

Chapter-6: Intermediate Code Generation

6.1 Intermediate Languages

6.2 Declarations

Chapter-7: Run Time Environments

7.1 Source Language Issues

7.2 Storage organization

7.3 Storage allocation strategies

7.4 Parameter Passing

Chapter-8: Code Generation

8.1 Issues in the design of a code generator

8.2 The Target Machine

8.3 Run-Time Storage Management

8.4 Basic blocks and Flow graphs

8.5 A Code generation algorithm

Chapter-9: Code Optimization

9.1 Principle sources of optimization

9.2 Function preserving transformation

9.3 Common Sub expressions AND Copy propagation

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Alfred V. Aho et al., Compilers: Principles, Techniques & Tools, 1986

References

1. Kenneth Loudon. 1997. Compiler Construction: Principles and Practice. PWS Publishing Company.
2. John Levine, Tony Mason & Doug Brown. 1992. **lex & yacc** (2nd edition). O'Reilly & Associates, Inc.
3. Andrew Appel. 2002. Modern Compiler Implementation in Java (2nd Edition). Cambridge University Press.
4. Aho, Lam, Sethi and Ullman. 2007. Compilers: Principles, Techniques, and Tools (2nd Ed.). Addison Wesley.

Course Title: Introduction to Distributed Systems
Course Number: INTE 543
Credit Hour: 3
Prerequisite: Data Communication and Computer Networks

Course Description

This course includes topics such as basic concepts in distributed systems and their architectures, communication mechanisms; synchronization related issues, consistency and replication, security, distributed files systems and distributed middleware applications of the trade. Moreover, the course covers both the hardware and software aspects of distributed systems. It is accompanied by project work that gives students hands-on experience and exposure to the de facto distributed system implementations like RPC of Windows and RMI of Java.

Course Objectives

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

- Understand concepts, principles and architectures of distributed systems
- Explain about remote procedure calls
- Comprehend concepts in distributed file systems, transactions, consistency and data security

Course Content

Chapter One: Introduction

- 1.1 Introduction
- 1.2 Definition
- 1.3 Goals of a Distributed System
- 1.4 Types of Distributed System

Chapter two: Architectures

- 2.1 Architectural Styles
- 2.2 System Architectures

Chapter Three: Processes

- 3.1 Introduction to Threads
- 3.2 Threads in Distributed Systems
- 3.3 Clients
- 3.4 Servers
- 3.5 Code Migration

Chapter Four: Communication

- 4.1 Layer protocols
- 4.2 Types of Communication
- 4.3 Remote Procedure Call

Chapter Five: Naming

- 5.1 Flat Naming
- 5.2 Structured Naming

Chapter 6: Synchronization

- 6.1 Clock Synchronization
- 6.2 Logical Clocks

Chapter 7: Consistency and Replication

- 7.1 Reasons for Replication
- 7.2 Replication as Scaling Technique

Chapter 8: Fault Tolerance

- 8.1 Basic Concepts
- 8.2 Failure Models

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%
Test 3	10%
Assignments	30%
Assignment I	10%
Assignment II	10%
Assignment III	10%
Final exam	40%
Total	100%

Text Book

A.S. Tanenbaum, Maarten Van Steem, Distributed Systems, Principles and Paradigms; 2006, ISBN 10: 0132392275.

References

1. Distributed Systems, Concepts and design, G. Coulouries, J. Dullimore, Y. Kendberg
2. Distributed Systems, S.Mullender

Course Title: E-Commerce
Course Number: INSY 557
Credit Hour: 3
Prerequisite: Internet Programming II

Course Description

This course introduces students to the emerging theories and practices of E-commerce strategies. Strategies associated with both sides of the electronic commerce world are included: ecommerce solutions for existing companies and E-business concept development for venture startups. Students will study the role of E-systems and the internet in commerce. Application of Information Technology in business is also part of the class.

Course Objectives

At the completion of this course, students will:

- be familiar with the different ways that electronic commerce can add business value to an organization;
- be able to list and analyze the key decision faced by an organization when establishing or updating a web presence;
- have an appreciation of the principles and use of key technologies applied in electronic commerce;
- understand the processes involved in doing business electronically; and
- be able to design and develop a good quality web presence for business purposes

Course Content

1. Overview of electronic commerce

- What is eCommerce?
- eCommerce Opportunities
- Types of eCommerce applications

2. Review of client and server Web technologies

- JavaScript
- PHP& MySQL
- Web Application development

4. Securing electronic commerce applications

- Transaction security
- Encryption
- Digital certificates

- Secure sockets layer

5. Electronic payment systems

- Digital cash
- Micro payments
- Credit card transactions
- Electronic and banking
- Smart cards

6. Implementing electronics commerce sites

- Enterprise computing
- Virtual hosting services
- Simplified e-commerce

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%
Test 3	10%
Assignments	30%
Assignment I	10%
Assignment II	10%
Assignment III	10%
Final exam	40%
Total	100%

Text Book

Erfan Turban et. al., Electronic Commerce, 2008, Pearson Education, ISBN-10: 0132243305

References

1. Mc Garvey and Campanelli, Start Your Own E-Business, 2006, ISBN-10: 1932156744
2. E-Business and e-Commerce Infrastructure: Technologies Supporting the e-Business Initiative. Abhijit Chaudhury, Jean-Pierre Kuilboer. Published by Mc-Graw Hill Companies, 2002. ISBN: 0-07-247875-6.

Course Title: Introduction to Telecom Technologies
Course Number: INTE 544
Credit Hour: 3
Prerequisite: Data Communication and Computer Networks

Course description

This course covers telephone system administration and the application of telephone systems to assist user organizations to achieve their goals. The subject is presented from the user organization's telecommunication manager's perspective. Management of premise equipment, costs, staffing, departmental structure and management, and the services provided by a telephone company's central office are included. Operational principles of audio, data and video telecommunication technologies are also included.

Course Objectives

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

- Explain theories and principles of telephone systems
- Describe usage of telecom systems in organizations
- Understand operational principles of audio and video data in telecommunication technologies
- Grasp the major services and their management in telecom companies

Course Content

Chapter 1: Introduction to Communications

- Introduction to the concept of communications
- Key milestones in the development of the modern PSTN
- Introduction to the modern PSTN
- Intro to Telecom terminology
- The history of divestiture and the effects of deregulation
- Overview of the Telecommunications Industry of the 21st century

Chapter 2: Basic Telephony Concepts

- Physical media utilized in communications.
- Transmission of signals in physical media - The concept of Bandwidth.
- The concept of Analog and Digital signals.
- Converting voice into an analog electrical signal Analog signaling, transmission loss, noise, filters.

- Analog to Digital conversion techniques; Pros & Cons.
- Techniques used to digitally encode analog voice signals - Pulse Code Modulation.
- Theory of Frequency and Time Division Multiplexing.
- Concept of Circuit Switching Vs. dedicated circuits.

Chapter 3: PSTN (Public Switched Telephone Network) Overview

- Switch Hierarchies, Routing, and the structure of the PSTN.
- Fiber optic transmission technologies
- Signaling in the modern PSTN,
- Local Number Portability (LNP) and AIN
- Wireless basics
- 3G wireless technologies

Chapter 4: Customer Premise Telecommunications Equipment:

- Products,
- Applications, and Services

Chapter 5: Introduction to data communication

- The historical evolution of data communications.
- The Concept of Packetization.
- Timing and Packet switching data. Redundancy and error control.
- Real Time vs Non Real Time Requirements
- Data communications equipment defined
- The OSI Model in context and TCP/IP
- IEEE 802 standards for Ethernet

Chapter 6: Introduction to Voice over IP and Computer Telephony Integration

- Introduction to the concept of Voice over data networks.
- Packet delays and Real Time Requirements
- VoIP Hardware
- Voice over IP. Standards, trends and examples.

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%

Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

Lillian Goleniewski, Telecom Engineering: Telecommunications Essentials, 2nd Ed.,
2007, Pearson Education

References

1. Carr I Snyder (2003) Management of Telecommunications, McGraw-Hill Irwin: Boston
2. Grant, August E. & Meadows, Jennifer H. (1998). Communication Technology Update (6th Edition). Boston, MA: Focal Press in association with Technology Futures, Inc.
3. A. Kershenbaum: Telecommunications Network Design Algorithms.
4. Norihiko Morinaga, Ryuji Kohno and Seiichi Sampei (Editors): Wireless Communication Technologies: New Multimedia Systems, Kluwer Academic Publishers, 2002.
5. Stuber: Principles of Mobile Communication, second edition, Kluwer Academic Pub.

Course Title: Geographical Information System and Remote Sensing

Course Number: INTE 556

Credit Hour: 3

Prerequisite: Computer Graphics

Course Description

This course prepares students to use geo-referenced data to produce geographical presentations. Topics include various kinds of coordinate systems and transformation between them, different ways of computing with geo-referenced data and choice in presentation parameters such as color schemes, symbol sets, and medium used.

Course objectives

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

- explain concepts and principles of geographic information systems
- internalize concepts and techniques of geo-referencing
- understand presentations techniques of location or geo-referenced information
- capture location data and form maps

Course Content

Part 1: Principles.

Chapter 1 Space and time in GIS.

- Introduction (The Editors).
- Space, time, geography (H Couclelis).
- Geography and GIS (R J Johnston).
- Arguments, debates and dialogues: the GIS–social theory debate and the concern for alternatives (J Pickles).
- Spatial representation: the scientist’s perspective (J F Raper).
- Spatial representation: the social scientist’s perspective (D J Martin).
- Spatial representation: a cognitive view (D M Mark).
- Time in GIS and geographical databases (D J Peuquet).
- Representation of terrain (M F Hutchinson and J C Gallant).
- Generalising spatial data and dealing with multiple representations (R Weibel and G Dutton).
- Visualising spatial distributions (M-J Kraak).

Chapter 2 Data quality.

- Introduction (The Editors).
- Data quality parameters (H Veregin).
- Models of uncertainty in spatial data (P F Fisher).
- Propagation of error in spatial modelling with GIS (G B M Heuvelink).
- Detecting and evaluating errors by graphical methods (M K Beard and B P Battenfield).

Chapter 3 Spatial analysis.

- Introduction (The Editors).
- Spatial statistics (A Getis).
- Interactive techniques and exploratory spatial data analysis (L Anselin).
- Applying geocomputation to the analysis of spatial distributions (S Openshaw and S Alvanides).
- Spatial analysis: retrospect and prospect (M M Fischer).
- Location modelling and GIS (R L Church).

Part 2: Technical Issues.

Chapter 4 GIS architecture issues.

- Introduction (The Editors).
- New technology and GIS (M Batty).
- GIS in networked environments (D J Coleman).
- Desktop GIS software (S Elshaw Thrall and G I Thrall).
- GIS interoperability (M Sondheim, K Gardels, and K Buehler).
- GIS customization (D J Maguire).

Chapter 5 Spatial databases.

- Introduction (The Editors).
- Relational databases and beyond (M F Worboys).
- Spatial access methods (P van Oosterom).
- Interacting with GIS (M J Egenhofer and W Kuhn).
- Principles of spatial database analysis and design (Y Bédard).

Chapter 6 Technical aspects of GIS data collection.

- Introduction (The Editors).
- Spatial referencing and coordinate systems (H Seeger).
- Encoding and validating data from maps and images (I Dowman).
- Digital remotely-sensed data and their characteristics (M Barnsley).

- Using GPS for GIS data capture (A Lange and C Gilbert).

Chapter 7 Data transformation and linkage.

- Introduction (The Editors).
- Spatial interpolation (L Mitas and H Mitasova).
- Multi-criteria evaluation and GIS (J R Eastman).
- Spatial tessellations (B Boots).
- Spatial hydrography and landforms (L Band).
- Intervisibility on terrains (L De Floriani and P Magillo).
- Virtual environments and GIS (J N Neves and A Câmara).
- The future of GIS and spatial analysis (M F Goodchild and P A Longley).

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

DeMers M.N., Fundamentals of Geographic Information Systems, 2006, ISBN-10 0470129069.

References

1. Chang, Kang-tsung 2009. Introduction to Geographic Information Systems with Data Files CD. 448 p. ISBN-10 007729436X.
2. C. P. Lo & Albert K.W. Yeung, Concepts and techniques of Geographic Information Systems, Prentice Hall of India, New Delhi, 2005
3. Albrecht, J 2007. Key Concepts and Techniques in GIS. London: Sage.

Course Title: System Simulation and Modeling

Course Number: INTE 558

Credit Hour: 3

Course Description

The course presents a holistic view of the modeling and simulation enterprise by starting from a general methodology which stresses the generic, application-independent aspects of modeling formalisms and their implementation. Topics covered include basic introduction to modeling and simulation, model syntax and semantics, system specification hierarchy, model classification, state automata and petri nets, higraphs and state charts, pseudo-random generators, input/output analysis, discrete event world views, process interaction, discrete event system specification, animation of simulation results, continuous-time models, solvers, sorting, population dynamics, system dynamics and object-oriented modeling of physical systems.

Course Objectives

At the end of the course, students will:

- Understand modeling and simulation from methodology to implementation,
- Apply modeling and simulation techniques in real world problems
- Explain how virtual reality is changing how we see and interact with our environment
- Apply the computer system can be used to simulate and emulate natural and man-made systems for various purposes

Course Content

CHAPTER 1. INTRODUCTION

- Systems modeling
- General systems theory
- Concept of simulation
- Simulation as a decision making tool
- Types of simulation.

CHAPTER 2. RANDOM NUMBERS

- Pseudo random numbers
- Methods of generating random variables
- Discrete and continuous distributions
- Testing of random numbers.

CHAPTER 3. DESIGN OF SIMULATION EXPERIMENTS

- Problem formulation
- Data collection and reduction
- Time flow mechanism
- Key variables
- Logic flow chart
- Starting condition
- Run size
- Experimental design consideration
- Output analysis and interpretation validation.

CHAPTER 4. SIMULATION LANGUAGES

- Comparison and selection of simulation languages
- Study of anyone simulation language.

CHAPTER 5. CASE STUDIES

- Development of simulation models using simulation language studied for systems like queuing systems
- Production systems
- Inventory systems
- Maintenance and replacement systems
- Investment analysis.

Method of Teaching

- Lecture supported by class work exercises, Practical lab exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Lab Exercise	20%
Final exam	40%
Total	100%

Text Book

Banks J, John Carson, Barry Nelson, and David Nicol. 2009. Discrete event System Simulation, 5e,. 640 p. ISBN-10 0136062121.

References

1. Bernard P. Zeigler, Herbert Praehofer, and Tag Gon Kim, Theory of Modeling and Simulation (2nd edition),USA, Academic Press, 2000.
2. Paul A. Fishwick, Simulation Model Design and Execution, USA, Prentice Hall, 1995.
3. Harrell et el., Simulation using Promodel, 3rd ed., 2000, McGrawHill [1]

Course Title: Selected Topics In IT
Course Number: INTE 568
Credit Hour: 3
Prerequisite: Completing Third Year

Course Description

This course gives an opportunity for the faculty to introduce emerging and new technologies and applications to students. Until the next curriculum revision the course may vary across the various batches so that it reflects new and state-of-the-art technologies. The specific course content will be decided by the Faculty Academic Council formally considering the availability of resources and current technological developments.

Course Objectives

The aim of this course is to expose students with:

- Current and state-of-the-art technologies in software development, hardware technology and computer systems
- Self-learning and updating oneself as technology changes
- New tools and techniques of doing things in ICT
- Work collaboratively in the cyberspace community

Course Content

- It depends on the topic that is selected during course offering decisions

Method of Teaching

- It depends on the topic that is selected during course offering decisions

Assessment

- It depends on the topic that is selected during course offering decisions

Text books:

- It depends on the topic that is selected during course offering decisions

References

- It depends on the topic that is selected during course offering decisions

19.3 Supportive Courses

Course Title: Mathematics I

Course Code: MATH 203

Credit Hours: 4

Prerequisite: None

Course Description

Basic mathematics logic, sets and their operations, functions and their graphs, matrix and its manipulations, system of linear equations and inequalities, elementary counting principles, recurrence relations, elements of Graph Theory: Definition , Examples, Matrix Representation, path and connectivity of a graph complete, regular and bipartite graph, trees and forest.

Course Objectives

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

- Explain the basic concepts of logic, sets and matrices.
- Grasp the concept of function.
- Apply the graphs of linear quadratic, logarithmic and exponential functions.
- Analyze the system of linear equations of 2×2 and 3×3 .
- Internalize the system of linear inequalities of 2×2 and 3×3 .
- Solve linear programming problems of smaller inequalities.
- Apply the methods and principles obtained to solve problems in the study of information science.
- Use the graphs in application software.

Course Content

Chapter 1: LOGIC, SETS AND SET OPERATION

- 1.1. Basics of mathematics logic
- 1.2. Proposition and logical connectives
- 1.3. Open propositions and quantifiers
- 1.4. Arguments and validity
- 1.5. The concepts of sets and elements
- 1.6. Notation
- 1.7. Description of sets
- 1.8. Special sets
- 1.9. Subsets and proper subsets

- 1.10. Venn diagrams
- 1.11. Set operations and their properties
- 1.12. Set operations
- 1.13. Basic properties of the set operations

Chapter 2: FUNCTIONS AND GRAPHS

- 2.1. Concept of a function
- 2.2. Combination and composition of functions
- 2.3. Linear function and its graph
- 2.4. Definition and properties of linear function
- 2.5. Graph of a linear function
- 2.6. Quadratic function and its graph
- 2.7. Definition and properties of a quadratic function
- 2.8. Graph of a quadratic function
- 2.9. Definition and properties of a polynomial function
- 2.10. Graph of a polynomial function
- 2.11. Exponential and logarithmic functions and their graphs
- 2.12. Definitions of exponential and logarithmic functions
- 2.13. Rules of exponential and logarithmic functions
- 2.14. Graphs of exponential and logarithmic functions
- 2.15. The trigonometric functions
- 2.16. Graphs of trigonometric functions
- 2.17. Trigonometric identities and equations
- 2.18. Solving a plane triangle

Chapter 3: MATRIX

- 3.1. Definition of matrix
- 3.2. Special matrices
- 3.3. Manipulation of matrices
- 3.4. Inverse of a matrix
- 3.5. Determinant of a matrix

Chapter 4: SYSTEM OF LINEAR EQUATIONS

- 4.1. System of linear equations in two variables
- 4.2. System of linear equations and augmented matrix
- 4.3. Gaussian elimination method
- 4.4. Gauss-Jordan method

Chapter 5: COMPLEX NUMBER

- 5.1. The concept of complex number
- 5.2. Operations on complex numbers
- 5.3. Conjugate and modulus of complex number
- 5.4. Finding the square root of a complex numbers
- 5.5. Geometric representation of complex numbers

Chapter 6: ELEMENTARY COUNTING PRINCIPLES

- 6.1. Basic counting principle
- 6.2. Permutation and combinations
- 6.3. The binomial theorem
- 6.4. Applications

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1.....	10%
Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%
Assignment III	10%
Final exam	40%
Total.....	100%

Text Book

Applied Finite Mathematics, S. T. Tan, 5th Edition, 1997 (30 copies)

References

1. College Algebra in Context, Harshberger and Yocco, 2007.
2. College Algebra , Hornsby and Lial, 2nd Edition, 1999 (38 copies)
3. College Mathematics for Business, Economics, Life and Social Sciences, Raymond A. Barnett 10ed, 2005
4. Mathematics for Business, Economics, Life Sciences, and Social Sciences, 11th Edition, 2008,

5. Applied Mathematics for Managerial, Life and Social Sciences , S.T. Tan,
4ed.,2003

Course Title: Mathematics II

Course Code: MATH 204

Credit Hour: 4

Prerequisite: Mathematics I

Course Description

The course introduces the basic concepts of Limits: One-sided limits, infinite limits, Continuity of a function, Derivatives, Derivatives of Inverse Trigonometric, Hyperbolic functions, Implicit differentiation, Applications of derivatives, Integration: indefinite integral, techniques of integration, definite integrals, Application of integrals: area, volume, arc length; Improper integrals; Differential Calculus of two variables: limits, continuity, partial derivatives, tangent lines, directional derivatives, gradient, total differential, tangent planes, relative extrema; Double integral in iterated form, polar form, Applications

Course Objectives

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

- Analyze the formal definition of Limit and Continuity
- Apply the Limit of Functions
- Internalize the points of discontinuity of Functions
- Comprehend the derivative of Functions
- Apply derivatives of different types of Functions
- Use derivatives to solve problems
- Apply derivatives to sketch the graph of Functions
- Analyze an integral of a Function
- Understand integrals of different types of Functions
- Use integrals to find areas and volumes

Course Content

Chapter 1: INTRODUCTION TO LIMIT AND CONTINUITY

1.1. Limits of functions

1.1.1. Definition of limits

1.1.2. Properties of limits and limit theorems

1.1.3. One –sides limits

1.1.4. Infinite limits and limits at infinity

1.1.5. Two important limits

1.2. Continuity

1.2.1. Continuous functions

1.2.2. Properties of continuous functions

Chapter 2: INTRODUCTION AND APPLICATION OF DIFFERENTIAL CALCULUS

2.1. Difference quotient of a function

2.2. Definition and properties of derivatives

2.3. Derivatives of some basic functions

2.4. Derivatives of combination and composition of functions

2.5. Implicit differentiation and higher derivatives

2.6. Application of derivatives

Chapter 3: DIFFERENTIAL CALCULUS OF FUNCTION OF TWO VARIABLES

3.1. Limits and continuity

3.2. Partial derivatives

3.3. The chain rule and implicit differentiation

Chapter 4: INTRODUCTION AND APPLICATION OF INTEGRAL CALCULUS

4.1. Definition of indefinite integral

4.2. Techniques of integration

4.3. Definite integral and fundamental theorem of calculus

4.4. Double integrals

4.5. Application of integrals

Chapter 5: SEQUENCE AND SERIES

5.1. Sequences

5.1.1. Definition, Examples and Limits of sequences

5.1.2. Convergence properties of sequences

5.2. Series

5.2.1. Definition of partial sum

5.2.2. Convergence and divergence test for infinite series

5.2.3. Differentiation and integration of power series

5.2.4. Taylor series and Taylor's formula

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%
Test 3	10%
Assignments	30%
Assignment I	10%
Assignment II	10%
Assignment III	10%
Final exam	40%
Total	100%

Text Book

College Mathematics for Business, Economics, Life and Social Sciences, Raymond
A. Barnett, 10th ed., 2003

References

1. Calculus and Its Applications Larry J. Goldstein, 9ed, 2005
2. Applied Mathematics for Managerial, Life and Social Sciences, S.T.Tan, 4ed, 2007
3. College Algebra, Hornsby and Lial, 2nd Edition, 1999 (38 copies)
4. Calculus Concepts and Context, James Stewart, 1997.

Course Title: Introduction to Small Business Management and Entrepreneurship

Course Number: MAEN 214

Credit Hour: 3

Prerequisite: None

Course description

This interdisciplinary course is designed to introduce students to the concept of sustainable entrepreneurship, a manageable process that can be applied across careers and work settings. It focuses on building entrepreneurial attitudes and behaviors that will lead to creative solution with in community organizational environments. Course topics include the history of entrepreneurships, the role of entrepreneurs in the 21st century global economy, and the identification of entrepreneurial opportunities. The element of creative problem solving, the development of a business concept/model, and the examination of feasibility studies and the social/moral/ethical implications of Entrepreneurship will be covered.

Course objectives

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

- Describe and define the nature of entrepreneurship within the context of society, organization and individuals
- Explain entrepreneurship as a creative and innovative process
- Grasp the importance of developing and using a business plan
- Discuss the factors to be considered in starting a new venture
- Understand the specific management issues involved in setting up and running a small enterprises.
- Distinguish between an entrepreneurial and conventional approach to management.
- Develop a concept for an innovative product or service in his/her own area of interest.
- Develop a personal framework for managing the ethical dilemmas and social responsibilities facing entrepreneurs.
- Equip with the basic knowledge and skills of starting and operating a business for they will be future managers (or owner-managers) of these firms.

Chapter 1: Introduction to Entrepreneurship

- 1.1. What is entrepreneurship
- 1.2. Why become entrepreneur

- 1.3. Characteristics of successful entrepreneur
- 1.4. Common myth about entrepreneurs
- 1.5. Entrepreneurship importance
 - 1.5.1. Economic impact of entrepreneurial firms
 - 1.5.2. Entrepreneurial firm's impact on society
 - 1.5.3. Entrepreneurial firm's impact on large firm
- 1.6. The entrepreneurial process

Chapter 2: Recognizing opportunities and generating ideas

- 2.1. Identifying and recognizing opportunities
- 2.2. Finding gaps in the market place
- 2.3. Personal characteristics of the entrepreneur
- 2.4. Techniques of generating ideas
- 2.5. Encouraging and protecting ideas

Chapter 3: Feasibility Analysis

- 3.1. What is feasibility analysis?
- 3.2. Role of feasibility analysis in developing successful business ideas
- 3.3. Product/service feasibility analysis
- 3.4. Industry/ market feasibility analysis
- 3.5. Organizational feasibility analysis
- 3.6. Financial feasibility

Chapter 4: Writing a business plan

- 4.1. What is a business plan?
- 4.2. Why a business plan
- 4.3. Outline of the business plan
- 4.4. Presenting the business plan to investors

Chapter 5: Industry and Competitor Analysis

- 5.1. Industry analysis
- 5.2. The importance of industry versus firm-specific factors
- 5.3. The five competitive forces that determine industry profitability
- 5.4. Competitor analysis
- 5.5. Identifying competitors
- 5.6. Sources of competitive intelligence
- 5.7. Completing a competitive analysis grid

Chapter 6: Developing and Effective Business Model

- 6.1. Business Model
- 6.2. The importance of business model
- 6.3. Components of an effective business model

Chapter 7: Getting financing of funding

- 7.1. The importance of getting financing or funding
- 7.2. Sources of equity funding
- 7.3. Sources of debt financing
- 7.4. Creative sources of financing and funding

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	20%
Test 1	10%
Test 2	10%
Assignments	20%
Assignment I	10%
Assignment II	10%
Course Project	20%
Final exam	40%
Total	100%

Text Book

Nicholas Siropilis: Entrepreneurship and Small Business Management 6th ed. 1998;
LI Indian Publishers, New Delhi

References

1. Kuratko, Donald. Entrepreneurship: Theory, Process and Practice, 2008. ISBN10: 0324590913
2. Katz, Jerry and R. Green, Entrepreneurial Small Business, 2008. ISBN 0073405063.
3. How to Write a Business Plan, Ethiopian Chamber of Commerce, 2004.
4. Small Business Management: Launching and Growing Entrepreneurial Ventures,J. Longenecker et al., 2007, 768 p. ISBN-10: 0324569728

Course Title: Introduction to Statistics and Probability

Course Code: STAT 301

Credit Hour: 3

Prerequisite: Mathematics I

Course Description

This course is designed to show students the meaning of statistics, methods of data collection, methods of data presentation, and how to calculate measures of central tendency, measures of variation, moments, skewness and kurtosis, counting techniques, concepts of probability, probability distributions, sampling and sampling distribution of the sample, linear regression and correlation.

Course Objective:

Upon completion of this course, the students will be able to;

- Discuss and use statistical methods.
- Organize and analyze statistical data
- Interpret and apply statistical analyses

Course Content

Chapter 1 INTRODUCTION

- Definition and Classification of Statistics
- Stages in Statistical investigation
- Definition of some terms
- Applications, Uses and limitations of Statistics
- Scales of Measurement
- Introduction to Methods of Data Collection

Chapter 2 METHODS OF DATA PRESENTATION

- Frequency Distributions Qualitative (Absolute, Relative, Percentage, Cumulative)
- Diagrammatic and Graphical Presentation of Data (Bar Charts, Pie-Chart, Histogram)

Chapter 3 MEASURES OF CENTRAL TENDENCY

- Introduction and Objectives of Measuring Central Tendency
- The Summation Notation
- Properties of Measures of Central Tendency
- Types of Measures of Central Tendency

- The Arithmetic Mean (Simple and weighted)
- The Geometric Mean
- The Harmonic Mean
- The Mode
- The Media and other Quintiles (Quartiles, Deciles, Percentiles)

Chapter 4 MEASURES OF VARIATION (DISPERSION)

- Information and Objectives of Measuring Variation
- Absolute and Relative Measures
- Types of Measures of Variation
 - The Range and Relative Range
 - The Quartile Deviation and Coefficient of Quartile Deviation
 - The Mean Deviation and Coefficient of Mean Deviation
 - The Variance, the standard Deviation and the Coefficient of Variation
 - The Standard scores

Chapter 5 ELEMENTARY PROBABILITY

- Introduction
- Definition of Some Probability Terms
- Counting Rules: Addition and Multiplication Rules, Permutation and Combination
- Probability of an Event
- Some Probability Rules
- Conditional probability and Independence

Chapter 6 PROBABILITY DISTRIBUTIONS

- Definition of Random Variables and probability Distributions
- Introduction to Expectation – Mean and Variance of Random Variable
- Common Discrete Probability Distributions- Normal Chi-square and t-distributions
- Common continuous probability Distributions - Normal Chi-square and t-distribution

Chapter 7 SAMPLING AND SAMPLING DISTRIBUTION OF THE MEAN

- Methods of Sampling
- Simple random sampling (the lottery method, table of random numbers)

- Sampling Distribution of the Sample Mean
- The central Limit Theorem

Chapter 8 ESTIMATION AND HYPOTHESIS TESTING

- Point and Interval Estimation of the Mean
- Hypothesis Testing about the Mean
- Test of Association

Chapter 9 Simple Liner Regression and Correlation

- Simple Liner Regression (Regression or Y on X)
- The Covariance and the Correlation Coefficient
- The Rank Correlation Coefficient

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1	10%
Test 2	10%
Test 3	10%
Assignments	30%
Assignment I	10%
Assignment II	10%
Assignment III	10%
Final exam	40%
Total	100%

Text Books

1. Basic Statistics for Business and Economics, Lind et al., 2006
2. Introduction to Statistics and its Applications, Adem Kedir Geleto, 2ed, 2009

References

1. Microsoft Excel Manual, A. Bluman, 2007
2. Elementary Statistics in Social Research, Jack Levin/James Alan, 9ed, 2003
3. Complete Business Statistics, Aczel and Sounderpandian. 2006
4. Just the Essentials of Elementary Statistics, Johnson/Kuby: 3ed, 2003

19.4 General Courses

Course Title: Civic and Ethical Education

Course Code: CEED 201

Credit Hours: 3

Prerequisite: None

Course Description

This course is designed to be offered as a common course to all students in the degree program in order to produce responsible, well-informed and competent citizens. The course encompasses the basic concepts of civic and ethical education, state and government, the values and principles of democracy, issues related to citizenship and patriotism, concepts of constitution and constitutionalism, fundamental human rights and major issue of development, basic ideas of international relations and contemporary issues.

Course Objectives

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

- Explain the subject matter of civic and ethical education
- Develop professional ethics
- Appreciate the difference between state and government
- Practice the principles and values of democracy
- Understand the concept of citizen and citizenship
- Know the concept of constitution and constitutionalism
- Understand the principles of the Ethiopian constitution
- Explain the basic concepts and features of human rights
- Understand and analyze the concepts of development, the theories of development
- Understand the development policies and strategies of Ethiopia
- Know the concept of international relations
- Discuss the national interest and foreign policies of Ethiopia

Course Content

Chapter One: Understanding Civic and Ethics

- Civics and Ethics: meaning; PURPOSES & OBJECTIVES OF Civics & Ethics, Sources of Civics and Ethics

Chapter Two: Understanding Society, State, and Government

- Perspectives on state and society
- Government

Chapter Three: Understanding Citizenship: Ethiopian Focus

- Definition and aspect
- Modes of acquiring
- Modes of loosing
- Citizenship in Ethiopia Context

Chapter Four: Constitution, Democracy and Human Right: Ethiopian in Focus.

- Concepts, Experiences, Ethiopia’s Experience, pre-1931, 1955, 1987, 1991, & 1995 constitutions.
- Meaning and approaches of democracy; actors in democratization and democratic elections

Chapter Five: Ethics and Civic Virtue

- Overview of ethics and ethical school of thought
- Selected issues in applied ethics
- Overview of civic virtue

Chapter Six: Issues in Civics and Ethics

- Contemporary Global Issues: Terrorism, Environmental Challenges, Poverty, Global Warming, Corruption, Rent Seeking, Globalization, cultural Imperialism, Gender...

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	30%
Test 1.....	10%
Test 2.....	10%
Test 3.....	10%
Assignments.....	30%
Assignment I.....	10%
Assignment II.....	10%

Assignment III	10%
Final exam	40%
Total.....	100%

Text Books

1. AAU (2005). Civic and Ethical Education, Compendium Part One. Addis Ababa: College of Social Sciences.
2. AAU (2005).Civic and Ethical Education, Compendium (2005) Part two. Addis Ababa: College of Social Sciences.
3. Miller, E.D.I (1984). Question that matter: an invitation to Philosophy
4. FDRE (1995). The constitution of Federal Democratic Republic of Ethiopia Addis Ababa.
5. Vincent, B. (1980) Philosophy: a text with readings, chapter three ethics and chapter four, Social Philosophy.

References

1. Gorge, D and Kalaer, H. (1993) An introduction to Business Ethics.
2. Matt, C. et al. (1991). Challenges of Citizenship.
3. Palmer, D. (1996). Does the center hold? An introduction to Western Philosophy. (chapter 7, Ethics, chapter 8, Critique of Traditional Ethical Theories: chapter 9 Political and Social Philosophy).
4. Boss, A. and Boss (1998). Perspective on ethics. London: Mayfield Publishing.
5. Kassaye, A. (2001), Fundamentals of Civic and Ethical Education. Aurum, A. and Popkin, H.(1996) introduction to Philosophy (Chapter 4 & Chapter 5)

Course Title: Microeconomics

Course Code: ECON 202

Credit Hours: 3

Prerequisite: None

Course Description

This course introduces and explores a variety of microeconomic topics, including: utility, preference, choice, consumer equilibrium, market demand, elasticity of demand, choice involving risk, production, cost, competitive market, pure monopoly and monopolistic competition. Students will work in teams on a professional task, using their knowledge of microeconomics.

Course Objectives

Upon successful completion of this course, students will be able to:

- Define utility, preference and choice.
- Explain how consumers optimize their objectives given the opportunity.
- Relate the concept of elasticity to consumer demand
- Describe production and cost and how they are interrelated
- Identify the basic market structures and describe their characteristics

Course Content

I. The Theory of Consumer Behavior

- 1.1 Cardinal Utility Theories: Utility Approach
 - 1.1.1 Total and Marginal Utility
 - 1.1.2 Consumer Equilibrium
 - 1.1.3 Derivation of individual's Demand Curve
- 1.2 Ordinal Utility Theories: Indifference Curve Approach
 - 1.2.1 Indifference Curves and the Marginal Rate of Substitution
 - 1.2.2 The Budget Constraint Line
 - 1.2.3 Consumer Equilibrium
 - 1.2.4 Price and income Consumption Curve
 - 1.2.5 Derivation of Demand
- 1.3 Consumer Surplus
- 1.4 Market Demand
- 1.5 Elasticity Demand

II. Choice involving Risk (Varian, Pindyck and Rubinfeld)

- 2.1 Introduction

- 2.2 Expected Utility
- 2.3 Risk Aversion
- 2.4 Diversification
- 2.5 Risk Spreading

III. Theory of Production

- 3.1 The Production Function
- 3.2 Technology
- 3.3 Laws of Production
 - 2.3.1 The Laws of Variable Proportions
 - 2.3.2 Returns to scale
- 3.4 Choice of Optimal combination of Factors of Production

IV. Theory of Costs

- 4.1 Short-Run Costs
- 4.2 Long- Run Costs
- 4.3 Dynamic Changes in Costs -the Learning Curve

V. Perfect Competition

- 5.1 The Short-Run Equilibrium of the Firm and the Industry
- 5.2 Market Equilibrium
- 5.3 The Long-Run Equilibrium of the Firm and the Industry

VI. Pure Monopoly

- 6.1 Short-run Equilibrium
- 6.2 Long-Run Equilibrium
- 6.3 Price Discrimination
- 6.4 Multi-plant Monopolist
- 6.5 Social Cost of Monopoly power

VII. Monopolistic Competition

- 7.1 Product Differentiation and the Demone Curve
- 7.2 The Concept of industry and product 'Group'
- 7.3 Short-Run Equilibrium
- 7.4 Long-Run Equilibrium
- 7.5 Excess Capacity and Welfare Loss

Method of Teaching

- Lecture supported by class work exercises

Assessment

Assignments, tests, quizzes, class work	40%
Practical work, Project work	30%
Final Examination	30%

Text Book

R.S. Pindyck and D. L. Rubinfeld, Microeconomics.

References

1. Hal R. Varian, Intermediate Microeconomics: A Modern Approach, 4th Ed.
2. Koutsiyannis, Modern Microeconomics.
3. E. Mansfield, Microeconomics: Theory and Applications.
4. D.S. Watson, Price Theory and its Uses.
5. J.P. Gold and C. Ferguson, Microeconomics Theory.
6. D.N. Dwivedi, Microeconomics Theory.
7. Essentials of Economics, 5e, by Mankiw, 2008
8. Principles of MicroEconomics by Frank and Bernanke, 3rd ed., 2007

Course Title:	Basic writing skills
Course Code:	FLEN201
Credit Hours:	3 Lecture + 1 Language Lab
Prerequisites:	None

Course Description:

This is an intermediate English course that provides students with the knowledge and skills to create grammatically correct and meaningful sentences. During lectures and within the Language Lab, students are given the opportunity to expand and practice their English language ability through speaking, listening, reading and writing activities. Textbook activities are provided to formalize and expand students' knowledge.

The course proceeds to paragraph writing and gives an introduction to basic essay writing. Attention is given to the reading of textbooks and everyday English materials. Students are also provided the opportunity to study spoken English and focus on pronunciation and fluidity.

Course Objectives:

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

- Correctly identify parts of speech and English tenses.
- Write grammatically correct and meaningful sentences.
- Produce sentences in terms of structure.
- Correct parallelism errors.
- Practice sentences dealing with action doers and receivers.
- Understand syllables, stress and clear pronunciation.
- Begin to create paragraphs, descriptive, compare and contrast essays.

Course Content:

1. Descriptive adjective and other parts of speech
2. Creating paragraphs and short stories using common tenses.
3. Sentence constructions
 - 3.1 Writing grammatically correct sentences
 - 3.2 Writing sentences with similar meanings using different structures
 - 3.2.1 Using the word "wish"
 - 3.2.2 Active and passive voices
 - 3.3 Practicing how to change sentence fragments
 - 3.3.1 Correcting run-ons into complete sentence forms
 - 3.4 Revising
 - 3.4.1 simple,
 - 3.4.2 compound,
 - 3.4.3 complex
 - 3.4.4 and compound-complex sentences.
 - 3.5 Combining sentences meaningfully
 - 3.5.1 Coordinating sentences

- 3.5.2 subordinating sentences
- 4. Parallelism and modifiers
 - 4.1 Correcting parallelism errors
 - 4.2 Using modifiers in different contexts
- 5. Producing and developing Paragraphs
 - 5.1 Writing a topic sentence
 - 5.2 Revising for unity, coherence and support and sentence skills
 - 5.3 Developing different types of paragraphs
 - 5.3.1 process
 - 5.3.2 cause and effect, etc.
- 6. Introducing essays
 - 6.1 Considering purpose and audience
 - 6.2 Choosing a topic
 - 6.3 Narrowing the topic
 - 6.4 Types of essays
 - 6.4.1 Introducing descriptive essay and compare and contrast essays
 - 6.5 Developing an essay
 - 6.5.1 Thesis statement, body and conclusion
 - 6.5.2 Revising for unity, coherence and support and sentence skills
- 7. Fundamentals of spoken English
 - 7.1 Pronunciation, syllables and stress
 - 7.2 Speech skills
- 8. Reading skills
 - 8.1 Focus on language
 - 8.1.1 Identifying the tenses in the stories.
 - 8.1.2 Indicating verb form (imperative form, etc...
 - 8.2 Developing reading skills
 - 8.2.1 Finding message of the story
- 9. Listening
 - 9.1 Note taking and summarizing
 - 9.2 Interactive exercises
- 10. Language Lab
 - 10.1 Active reading 9.3 Communication skills 1 & 2
 - 9.2 Tense busters 9.4 Clear pronunciations

Texts:

Primary Text:

1. Fawcett, S (2007) Evergreen: A Guide to Writing with Readings. Houghton Mifflin. USA.

Secondary Text:

1. Bucsemi, S.V. and Smith, C. (2007). 75 Readings: Anthology. 10th edition. New York: McGraw-Hill.
2. Boardman, C.A. and Frydenberg, J (2002). Writing to communicate: paragraphs and essays. 2nd edition. New York: Pearson

3. Fleming, L., (2005). Reading for results, 9th edition. New York: Houghton Mifflin.
4. Kennedy, X.J., Kennedy D.M. and Aaron, J.E. (2003). The brief Bedford Reader, 8th Edition. New York: Bedford.
5. Lebauer, R.S. (1988). Learn to Listen; Listen to Learn- an advanced ESL-EFL Lecture Comprehension and Note Taking text book. New Jersey: Prince Hall.
6. Level, B. (2001). Writing and Grammar: Communication in Action, New Jersey: Prentice Hall,
7. Wyrick, J., (2005) Steps to writing well, 6th Edition,

Teaching-Learning Methods: Student-centered learning through lectures, Language Labs, group work and assignments.

Evaluation Modalities:

Modality	%
Class participations	15
Test 1	10
Assignment	20
Common test 2	20
Test 3	10
Final Exam	25
Total	100

Grade Specifics:

Task		%
Class participations	Lectures	10
	Language Lab	5
Tests	Listening Test	5
	Short Speech	5
Assignments	Written Assignments x 5	20
	Free Writing Assignment in class	5
	Language Lab Computer Project	5
Common test		20
Final Exam		25
Total		100

Course Title:	Advanced writing skills
Course Code:	FLEN202
Credit Hours:	3 Lecture + 1 Language Lab
Prerequisites:	FLEN201 Basic Writing Skills

Course Description:

This advanced writing skills course enables students to create and critically analyse business and academic written English. Various forms of English communication are studied, including: descriptive and process essays, professional letters, emails, summaries, memos and research reports.

During the course students are provided opportunities to produce high-quality academic reports ensuring they understand formal and informal styles, paraphrasing texts, plagiarism, incorporating evidence with proper documentation, topics, paragraphs and essay development

Listening and reading exercises provide students the chance to practice creating text and audio summaries with real-life English materials.

Course Objectives:

After completing the course students will be able to:

- Write paragraphs with clear topic sentences,
- Write essays with concise thesis statements, introductions and conclusions,
- Write clear and concise business letters, emails and memos,
- Efficiently paraphrase and summarize texts and audio information,
- and create high-quality evidence-based academic research papers that include international-standard referencing.

Course Content:

1. Planning and writing essays
 - 1.1 Narrative, persuasive, expository and descriptive,
 - 1.2 Information mapping,
 - 1.2.1 topic,
 - 1.2.2 subtopics,
 - 1.2.3 topic sentences,
 - 1.2.4 thesis statement.
 - 1.3 Developing sentences using transitional words,
 - 1.4 Introductions, body paragraphs, conclusion.
2. Writing direct and indirect quotations.
3. Writing informal, formal and business letters.
4. Editing and writing
 - 4.1 email messages and memos,

- 4.2 summaries,
- 4.3 research reports,
- 4.4 and proposals.
- 5. Introducing business communication
- 6. Paraphrasing texts and summarizing audio and written texts.
- 7. Reading exercises
 - 7.1 Reading for details,
 - 7.2 Reading for gist,
 - 7.3 Reading for specific purposes.
- 8. Listening exercises
 - 8.1 Oral answers for oral questions
 - 8.2 Written answers for oral questions
 - 8.3 Listening exercises for lecture note taking
- 9. Group presentation of a research paper
 - 9.1 Printed document (1000 words)
 - 9.2 Oral presentation
- 10. Language Lab
 - 10.1 Road to IELTS 4: writing 1 and 2
 - 10.2 BBC Learning English
 - 10.2.1 General and business English
 - 10.2.2 Talking business
 - 10.2.3 Presentations
 - 10.3 Study skills success (intermediate and advanced)
 - 10.4 Typing skills (using the software in the language lab)

Texts:

Primary Text:

2. Alerd, G.J., Brusaw, C.T. and Oliu, W.E. (2009). *Handbook of Technical Writing*. 9th ed. New York: St Martin's press.
3. Fawcett, S (2007). *Evergreen: A Guide to Writing with Readings*. Boston: Houghton Mifflin.

Secondary Text:

1. Alfred, G.,J. Brusaw, C. T. and Oliu, W. (2009), *The Business Writers Handbook*. 9th edition. Boston: St Martin's press.
2. Guffey, M. E., (2004), *Essentials of Business Communication*. 6th ed, Ohio: Thomson South-Western.
3. Level, B. (2001). *Writing and Grammar: Communication in Action*, New Jersey: Prentice Hall,
4. Langan, J. (2008), *Exploring Writing: Sentences and Paragraphs*, 2nd , New York: McGraw Hill,
5. Merkel, M. (2010). *Technical Communication*. 9th ed. Boston: Bedford,
6. Memering, D. and Palmer, W. (2006). *Discovering Arguments, an Introduction to Critical Thinking and Writing with readings*. 2nd ed, New Jersey: Pearson.
7. Soles, D. (2005). *The Essentials of Academic Writing*. Houghton Mifflin, New York.

Teaching-Learning Methods: Student-centered learning through lectures, Language Labs, group work and assignments.

Evaluation Modalities:

Modality	%
Class participations	15
Test 1	15
Assignments	15
Test 2	10
Common Test 3	20
Final Exam	25
Total	100

Grade Specifics:

Task		%
Class participation	Lectures	10
	Language Lab	5
Classwork	Presentation of a Research Paper	5
	Text Summary Test	5
	Audio Summary Test	5
Assignments	Written Assignments x 5	15
	Essay Writing in class	5
	Research Paper and presentation	10
Common Test		20
Final Exam		25
Total		100

Course Title: Introduction to Philosophy (Logic)

Course Number: PHIL 201

Credit Hours: 3

Prerequisite: None

Course Description

The subject matter and purpose of logic; the fundamental laws of logic; the distinction between deductive and inductive arguments; validity and soundness in an argument; language and definition; rules of lexical definition; fallacies; categorical propositions; syllogism; syllogistic rules and fallacies; propositional logic; analogical reasoning and science and hypothesis.

Course Objectives

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

- Develop the skills needed to construct sound arguments of one's own and evaluate the arguments of others.
- Instill a sensitivity for the formal component in language, a through command of which is indisputable to clear, effective and meaningful communication
- Process the cultivation on the habits of correct reason/critical/ thinking.
- Make distinction between good and bad arguments and avoid fallacious reasoning; and also expose students to different types of fallacy in such a way that they develop the habits of thinking self-independently.

Course Content

CHAPTER ONE Basic Concepts

- Introduction
- What is Philosophy?
- Branches of Philosophy.
- What is logic?
- The nature of arguments

CHAPTER TWO Meanings and Definitions

- Cognitive & Emotive Meanings of terms
- Intension & Extension of Terms
- Definitions & their purposes
- Definitional Techniques
- Criteria of Lexical Definitions

CHAPTER THREE Informal Fallacies

- What is fallacy?
- Fallacies of Relevance
- Fallacies of Weak Induction
- Fallacies of Presumption
- Fallacies of Ambiguity
- Fallacies of Grammatical Analogy

CHAPTER FOUR Categorical Propositions

- Components of categorical proposition
- Quality, quantity and distribution
- Venn Diagrams and the Modern Square of Opposition
- Conversion, Obversion & contraposition
- Traditional Square of Opposition

CHAPTER FIVE Categorical Syllogisms

- Standard form, mood & figure
- Venn Diagram
- Rules and Fallacies

Method of Teaching

- Lecture supported by class work exercises
- **Assessment**
- Class participation 10%
- Tests 30%
- Group assignment 10%
- Final examination 50%

Text Book

Irving M. Copi et al, Introduction to Logic, 13th edition, 2009

References

1. Irving M. Copi, Introduction to Logic, 12th edition, 2005
1. Being Logical: A Guide to Good Thinking, D. McNerny, 2005
2. Logic, 2nd edition, Patrick J. Hurley, 1984.

Course Title:	English for Communication II
Course Code:	FLEN301
Credit Hours:	3 Lecture + 1 Language Lab
Prerequisites:	FLEN202 English for Communication I

Course Description:

This course provides students with the skills for effective communication specifically concentrating on public speaking, proposal writing and group activities. Through student-centered learning approach students will be provided the opportunity to practice audience and purpose identification, speech planning, use of visual aids and persuasive performance.

Students will give presentations of varying lengths, conduct research, write proposals relevant to their field of study and present research using audio visual equipment. They will also conduct group meetings in which they negotiate issues, apply critical thinking to decision-making, deal with conflict respectfully and use English conversational conventions.

Participants will also be allowed the opportunity to develop specific business skills vital for their future employment including creating their resume and preparing for job interviews.

Course Objectives:

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

- Communicate clearly, correctly and appropriately with others through spoken and written English.
- Critically understand the importance of effective communication.
- Prepare presentations with an awareness of audience and purpose.
- Evaluate and refine presentations for crucial and persuasive information.
- Produce effective presentations with and without AV materials.
- Show effective listening skills in different cultures.
- Employ active communication strategies such as giving and receiving feedback.
- Apply critical thinking and decision-making skills to technical tasks.
- Work effectively in small groups.
- Write a professional resume and cover letter.

Course Content:

11. Basics of English communication
 - 11.1 Philosophy, meaning, significance and styles of communication
 - 11.2 Communication skills: receptive and productive
 - 11.3 Critical analysis and discussion of famous speeches
12. Audience-centered approach to communication
 - 12.1 Audience analysis
 - 12.2 Purpose identification: inform or persuade
13. Developing presentations
 - 13.1 Preparation: gathering, sorting and selecting information

- 13.2 Using informational or persuasive strategies to fit purpose
- 13.3 Short speeches
- 14. Final presentation preparation
 - 14.1 Editing for purpose, audience and time
 - 14.2 Outlining and creating presentation notes
 - 14.3 Audio Visual Aids
 - 14.4 Rehearsing: memorization, timing, visual aids, technology, feedback
- 15. Speech delivery
 - 15.1 Vocal characteristics: volume, tone, pitch, pronunciation and articulation
 - 15.2 Non-verbal characteristics:
 - 15.2.1 eye contact,
 - 15.2.2 expressions,
 - 15.2.3 posture, movement and gestures
 - 15.3 Maintaining audience focus
- 16. Working within small groups
 - 16.1 Effective participation:
 - 16.1.1 conversation skills,
 - 16.1.2 rule-based structures,
 - 16.1.3 non-verbal communication.
 - 16.2 Leading groups, managing meetings, setting agendas
 - 16.3 Problem solving through negotiation, critical thinking and collaborative writing
 - 16.4 Group presentations
- 17. Research-based proposal
 - 17.1 Selecting and narrowing the topic
 - 17.2 Research, investigation and note-taking
 - 17.3 Developing the report
- 18. Employment skills
 - 18.1 Resume writing: planning, language and formatting
 - 18.2 Purposeful introductory letters
 - 18.3 Communication for job interviews

Texts:

Primary Texts:

1. Beebe, S. A. & Beebe, S. J. (2006). Public Speaking: An Audience-Centered Approach. Florida: Pearson Education.
2. Lucas, S. (2009). The art of public speaking. 10th edition, New York: McGraw Hill.
3. Markel, M. (2010). Technical Communication. 9th edition. Boston: Bedford.

Secondary Texts:

4. Shatzman, B.T. (2003). Business Communication Today. 7th edition. New Jersey: Prentice Hall.
5. Thill, J.V. and Povee, C.L. (2005). Excellence in Business Communication. 6th edition. New York: Prentice Hall.
6. Zarefsky, D. (2002). Public Speaking Strategies for success. Boston: Prentice Hall.
7. Ober, S. (2000). Contemporary Business Communication. 4th edition. Boston: Houghton Mifflin.

8. Guffey, M.E. (2004). Essentials of business communication. 6th edition. Ohio: Thomson South-Western
9. Baker, W.H. (2007). Writing and Speaking for Business.

Teaching-Learning Methods: Student-centered learning through lectures, Language Labs, group work, presentations and assignments.

Evaluation Modalities:

Modality	%
Class participations	15
Group work	20
Assignments	20
Common Test	20
Final Exam	25
Total	100

Grade Specifics:

Task		%
Class participations	Lectures	10
	Language Lab	5
Group work	Interview Role-Play	2
	Group Discussion	4
	Individual Short Speech	5
	Group Research Proposal Presentation	10
Assignments	CV and Introductory Letter	4
	Research Proposal	5
	Written Assignments x 5	10
Common Test		20
Final Exam		25
Total		100

Course Title: General Psychology

Course Code: PSYC 201

Credit Hours : 3

Prerequisites: None

Course Description

This survey course explores the scientific study of human nature, behavior and cognitive processes. The major areas of psychological study will be reviewed, including history, biology, memory, learning, development and personality, abnormal psychology and social psychology. Emphasis will be placed on applying

psychological principles and data to life experience. Students will learn to understand the psychological foundations of human behavior in all occupations. They will learn how to apply psychological principles and concepts in order to overcome human and environmental barriers to effective relationships. Topics to be covered include motivation, emotion, knowledge retention, group dynamics, worker efficiency, sensation and perception, personality, and development of attitudes. Students will complete the proficiency task of developing a personal statement of goals and values.

Course Objectives

Upon satisfactory conclusion of this course, students will have developed the ability to:

- Understand human behavior and relationships in different professions and in life at large
- Apply knowledge gained from the course in the areas of business, government and education
- Understand the major factors that influence group and individual decision-making
- Understand effective human and environmental relationships
- Use knowledge of psychology to develop a personal statement of goals and values

Course Content

CHAPTER ONE: What is Psychology?

- 1.1. What is psychology?
- 1.2. Definition and meaning of psychology
- 1.3. The Roots of psychology
- 1.4. The Emergence of psychology as a science.
- 1.5. Early schools of Psychology
- 1.6. Contemporary psychological perspectives
- 1.7. The goals of psychology
- 1.8. The sub – Fields of psychology
- 1.9. Research methods in psychology

CHAPTER TWO: Principles of Learning

2. 1. Definition of Learning
2. 2. Transfer of learning
2. 3. Factors Affecting Learning
2. 4. Forms of Learning: Types of Learning
2. 5. Theories of Learning

2.5.1. Behavioral Theories of Learning

2. 5.1.1. Types of Learning by conditioning

2. 5.1.1A. Classical Conditioning (Respondent conditioning)

2. 5.1.1B. Operant conditioning (Instrumental conditioning)

2.5.1.1C. Differences between Classical and Operant Conditioning.

2.5.2. Cognitive Learning.

CHAPTER THREE: Developmental Psychology

3. 1A. Definition of Developmental Psychology

3. 1B. Development and Related Terms

3. 2. Sources of Development

3. 3. Principles of Development

3. 4. Aspects of Development

3. 5. The Prenatal Development and Birth

3. 6. Stages of Human Development

3. 6. 1. Prenatal Development

1. The Germinal period

2. The Embryonic Period

3. The Fetal period

3. 6. 2. Postnatal Development

1. Infancy Stage

2. Childhood Stage

a. Early childhood period

b. Late childhood Period

3. Adolescence Stage

4. Adulthood Stage.

CHAPTER FOUR: Remembering (Memory) and Forgetting

4. 1. Remembering (Memory)

Definition of Remembering

4. 1. 1. Components (stages) of Memory

4. 1. 2. Types of Memory (remembering)

4. 1. 3. Factors Affecting Remembering (memory)

4. 1. 4. Improving Memory

4. 1. 5. Five Good Ways to improve Memory Recall

4. 2. Forgetting

4. 2. 1. Theories of Forgetting

4. 2. 2. Types of Forgetting (Reasons of Forgetting)

CHAPTER FIVE: Motivation and Emotions

5. 1. Motivation

5. 1. 1. Definition of Motivation

5. 1. 2. Classification of Motivation

5. 1. 3. Aspects of Motivation

5. 1. 4. Theories of Motivation

5. 1. 5. Frustration and Conflict of Motives

5. 2. Emotions

5. 2. 1. Definition of Emotions

5. 2. 2. Types of Emotions

5. 2. 3. Functions of Emotions

5. 2. 4. Theories of Emotions

CHAPTER SIX: Psychology of Personality

6. 1. Definition of Personality

6. 2. Theories of Personality

6. 2. 1. Psychoanalytic Theory of personality

1. Levels of Consciousness (Mind)

2. Structure of personality

3. Psychological Defense Mechanisms

4. Psychological Stages of Personality Development

6. 2. 2. Neo – Psychoanalytic Theories of Personality

6. 2. 3. Humanistic Theories of Personality Development

6. 2. 4. Trait Theories of Personality Development

6. 2. 5. Type Theories of Personality Development

CHAPTER SEVEN: Perception

7. 1. Definition of Perception

7. 2. Sensation and Perception

7. 3. Perception and Learning

7. 4. Shifting of Attention

7. 5. Perceptual Organization

7. 6. Perceptual Constancy

7. 7. Errors of Perception

7. 8. The Role of Motivation and Learning in perception

7. 9. Attention.

Method of Teaching

- Lecture supported by class work exercises

Assessment

Assignments	20%,
Projects, practical work	20%
Tests	20%
Final Exam	40%

Text Book

Kalat, James. Introduction to Psychology, 8th ed. Wadsworth, 2008

References

1. Weiten, Wayne, Diane Helpert. Psychology: Themes and Variations: with Concept Charts. Briefer Edition, 7th ed. Thomson-Wadsworth, 2007
2. Psychology: A Modular Approach to Mind and Behavior, 10e, Dennis Coon, 2006.
3. Psychology, Stephen Davis and Joseph Pallidino, 4e, 2003
4. The Essential World of Psychology, Samuel Wood and Ellen Green Wood, 2002.
5. Psychology: A Journey, Dennis Coon, 2002.
6. Psychology, 7th ed., John Santrock, 2005

Course Title: Leadership Skills

Course Code: MAEN 441

Credit Hours: 3

Prerequisites: None

Course Description

This course challenges students to be leaders as leadership is in each and every one. The course outlines how one identifies one's leadership niche and helps one cultivate what one may have to offer as a leader. The course provokes students to think critically about their future life path and in so doing encourages students to find themselves in a world of leaders. In initiating students to such self-discovery, the course encourages students to be committed to certain steps of personal transformation that would set them as leaders. The course uses competency based training as an approach. Concepts are revealed and discussed and applications are attempted within a mock arrangement. Students will then be required to explore leadership qualities within the work environment. Cases shall be used as examples of real life situations for leadership exercises, and speakers invited to talk about their own leadership journeys.

Course Objectives

The course shall impress upon each student that each is a leader and with this awareness the course shall encourage students to work on their leadership niche.

The course shall then impress upon students the attitudinal changes that they need to make and the life goal paths that they should explore.

Course Content

Chapter 1: Introduction

- 1.1. Definition of Leadership
- 1.2. Description of Leadership

Chapter 2: Approaches to Leadership

- 2.1. Trait Approach
- 2.2. Skills Approach
- 2.3. Style Approach

Chapter 3: Theories of Leadership

- 3.1. Contingency theories
- 3.2. Path-Goal Theory
- 3.3. Leader-member exchange theory

Chapter 4: Types of Leadership

- 4.1. Transformational Leadership
- 4.2. Authentic Leadership
- 4.3. Team Leadership
- 4.4. Servant Leadership
- 4.5. The practices of exemplary leadership

Chapter 5: Other Contemporary issues of Leadership

- 5.1. Women Leadership
- 5.2. Culture and Leadership

Method of Teaching

- Lecture supported by class work exercises

Assessment

Tests	20%
Leadership in the class	20%
Leadership Project	20%
Final Exam	40%

Text Books

1. Focus on Leadership: Servant Leadership for 21st Century, Ken Blanchard (30 c.)
2. Awakening the Leader Within: A Story of Transformation, Kevin Cashman, Jack Forem
3. The Purpose-Driven Life, Rick Warren, 2002 (150 c.)

Reference Books

1. Principle-Centered Leadership, Steven Covey, 1991. (10 c.)
2. Leadership Challenges, Kouzes and Posner, 4th Ed., 2008
3. Leadership: Courage in Action, Robert Terry, 1999.
4. Leadership: Theory and Practice, Northouse, 9th Ed, 2009