Course Details
Course Name: CTP209 – Systems Development
Course Credits: 3
ECTS Credits: 6
Prerequisite: CTP108 Computer Programming for Business

Semester: 2011-2012 Fall
Instructor: Serhat M. AZGUR
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Room, Phone: GZ-14A, x-3361
Office Hours: Weekdays, 08:30 – 18:00

Lecture hours and place: Tue: 10:40 – 12:30, GZ55 - Fri: 08:40 – 10:30, GB52
URL (web pages): http://2010-2011-fall.moodle.bilkent.edu.tr/

Course Description
This course presents a comprehensive introduction to the systems design skills in information management that students, as future users and/or systems analysts, will need to deal with in computer-integrated business environment. The course provides the students with the skills to identify business problems which may be solved by technology-based solutions, determine requirements for information systems solutions, and develop designs which form the basis for implementing systems, as well as a strong foundation in systems analysis and design concepts, methodologies, techniques, and tools.

The course includes Waterfall Model (Systems Development Life Cycle), Systems Analysis and Design Techniques (Process Modeling (DFDs), Logical Modeling (decision tree, decision table, structured English), Data Modelling (E-R Diagrams), Object-Oriented Modelling (UML-use cases), Project Management tools (CPM, Gantt, PERT) and evaluation of engineering standards such as MIL-STD-498, IEEE/EIA 12207, ISO 9000-2000 and CMM.

There will be lectures and discussions given by invited guests from the Industry.

Aim
This course aims to introduce students to the basic principles of systems analysis and design and to give them experience of developing a software system in a team. Specifically;

- introduce students to the traditional practices for specification, design, implementation, testing and operation of information systems,
- provide a framework for more detailed material on design which is taught in other courses, involve students into development of a sample project (term project), which approximates as closely as possible in the university environment with the project development conditions found in the industry.

Learning Outcomes
On successful completion of this course students should:

- understand the qualifications of systems analysts and project managers to design better information systems.
- discuss the aims and objectives of information systems in the context of a human activity system for better systems development.
- understand analysis and design techniques and methods to meet the special needs of current information systems.
• use variety of analysis and design methods to specify and propose information systems.
• be able to produce and document the key deliverable’s of software development life cycle.
• know how to use MS Project as a CASE tool.
• identify current industry standards for information systems development.

Course Outline:
• The Systems Development Environment & SDLC
• Systems Analyst and Managing the Information Systems Project
• Automated Tools for Systems Development
• Identifying and Selecting Systems Development Projects
• Initiating and Planning Information Systems Projects
• Determining System Requirements and Design Strategies
• Structuring System Requirements
  i. Process Modelling
  ii. Logic Modelling
  iii. Conceptual Data Modelling
• Object-Oriented Analysis and Design
• Alternative Development Strategies
• Implementation & Test Strategies, Maintaining Information Systems
• Software Systems Development Standards & Project Management

Text Book:

Reference Books:
Any book whose name starts with “Systems Analysis and Design” definitely helps to grasp the subject better. The following books can be consult for different approaches or further readings (they are all available at the Bilkent University Library):

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>BLISS-Call #</th>
<th>ISBN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems Analysis And Design</td>
<td>Alan Dennis, Barbara Haley Wixom</td>
<td>QA402.D43 2000</td>
<td>0-471-24100-8</td>
</tr>
<tr>
<td>Systems Analysis And Design</td>
<td>Kenneth E. Kendall, Julie E. Kendall</td>
<td>QA76.9.S88K45 1992</td>
<td></td>
</tr>
<tr>
<td>Analysis Within The Systems Development Life-Cycle</td>
<td>Rosemary Rock-Evans</td>
<td>QA76.9.S88R59 1987</td>
<td>0-08-034100-4</td>
</tr>
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Other Resources:
• Lecture notes prepared by the instructor;
• Bilkent Library, electronic databases like Safari Books Online, other web references/resources.
**Instructional methods, techniques and tools:**
- In class teaching.
- Lab Sessions, Labworks concerning Gannt charts and Pert charts using Microsoft Project s/w,
- Subject related questions-answers and discussions on the web through Moodle,
- Invited guests from the Industry.

**Assessments & Grading:**
To receive a passing credit, students must achieve at least 50 percent on the course composite grade (= "D"). Although, the assessments and weights may vary from semester to semester, the weighting of the course composite grade for this semester is as follows:

- Quizzes/Homeworks, Lab: 5%
- Term Project: 25%
- Midterm: 25%
- Final: 35%
- In-class participation: 10%

There will be several quizzes and homeworks; the number will depend on the particular academic semester.

Moodle Course Management System is extensively used throughout the academic semester. Questions and answers of quizzes and exams can be found in Moodle together with the other related resources.

**Term Project Descriptions**
Scope, content and sample topics of the Term Project shall be announced in Moodle and/or CTE web site (distribution of 25% (course grade) is as follows:

- 10% comprises the presentation at the end of the semester,
- 5% comprises the peer evaluation of the members of each project group.
- 10% comprises how well the Term Project is prepared (guidelines will be announced in Moodle).

**Policies for Late Submissions** (if applicable)
There is a penalty for late submission for homeworks and the Term Project.

- 5% off of the announced grade for the first week,
- 1% off for every other following week.

**Attendance:**
According to Bilkent University’s regulations attendance is mandatory. In-class Participation, which is 10% of the final grade, is going to be decided on the following factors:

- Lecture attendances (although attendance is compulsory, I take roll calls).
- Active participation in class discussions.
- Reflection letter to be written at the end of the semester, and
- Online participation in Moodle.

Lab attendance is mandatory. If you miss more than three lab sessions (all valid excuses must be endorsed by the Bilkent Health Center and/or Department Chair), you will receive an automatic zero as the Lab grade.

**Make-up Policy**
If you have missed any one of the assessments (whether an exam or any other type) due to a serious problem, you must inform the instructor immediately, together with the supporting documentation (e.g. hospital report, police report etc.). You may not be able to get a make-up exam or any other type of compensation if your case is not convincing.
Academic Integrity
We trust our students are honorable and honest, so that they do not copy from each other’s work to receive a grade they do not deserve. We believe, each student has a responsibility to understand, accept and comply with the university’s standards of academic conduct as set forth by the Code of Academic Conduct, as well as policies established by the schools and colleges. Cheating, collusion, misconduct, fabrication, and plagiarism are considered serious offense. “Student Code Of Discipline” is presented in the following web page:
http://www.bilkent.edu.tr/bilkent/admin-unit/hukukm/edisiplin.html

Weekly outline:  (based on a semester with 14 full weeks, with a week reserved for midterm)

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Lab</th>
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| 01   | Information about the course.  
Introduction, Information systems - 1 Lecture  
Information systems as an enabling technology for human endeavour. Concepts: data, information, knowledge, system, purposive system, Systems analysts vs. programmers in Systems Development. Definitions – 3 Lectures  
| 02   | The “Systems Analyst” & Managing the Information Systems Projects  
Analyzing and Problem Solving - 3 Lectures  
Ability (or capability ?) of a Systems Analyst and Systems Thinking. Technical and Management Skills of a Project Manager.  
Review & Applications – 1 Lecture  
Gantt and PERT charts. Specific field applications, case study and exercises. |       |
| 03   | Automated Tools for Systems Development  
CASE in Systems Development Process – 3 Lectures  
What are the CASE tools, why do we need them ? Reverse engineering and reengineering. Typical components of a CASE (automated software tools) environment.  
The Software Life Cycle - 1 Lecture  
Description of the phases of the software life cycle and the major deliverables and activities associated with each phase. |       |
| 04   | Identifying and Selecting Systems Development Projects  
Decision Process - 3 Lectures  
Analysis and different Approaches - 1 Lecture  
Corporate Strategic Planning vs. Information Systems Planning. Impact of IS Projects on Business Objectives. |       |
| 05 | Initiating & Planning Information Systems Projects Structures as output parameters.  
*Information Systems Projects - 1 Lecture*  
What is Statement of Work (SOW) and BPL (Baseline Project Plan)? Feasibility study. Cost-Benefit Analysis. Value (cost of money) – 2 Lectures  
Find the cost of the IS Project and estimate the *(benefit)* gains of the finished system. Find Net Present Value. Break-Even Analysis. Tangible/Intangible Benefits, Tangible/Intangible Costs.  
*Managing Information Systems Projects - 1 Lecture*  
What is CPM, PERT and Gantt charts? And how to prepare and use them? | Labwork 01  
MSProject Application-1 |
| 06 | Determining System Requirements and Design Strategies  
*Information Gathering - 4 Lectures*  
Traditional Methods; Interviews, Questionnaires, Observations, Document Analyzing, Procedures and Users. Modern Information Gathering Techniques; JAD (Joint Application Design) of IBM, CASE tools & Prototyping. Radical Methods; Business Process Reengineering (BPR), Disruptive Technologies. Validation of requirement by e.g., prototyping. Deficiencies in the traditional approach to requirements. | Labwork 02  
MSProject Application-2 |
| 07 | MIDTERM EXAM |
| 08 | Structuring System Requirements  
*Process Modeling - 2 Lectures*  
Data Flow Diagram (DFD) mechanics. Developing DFDs, Analysis and design techniques. Combining techniques within design methods.  
*Logic Modeling – 2 Lectures*  
Definitions and examples of Structured English, Decision Tables and Decision Trees. How to construct and use them. |
| 09 | Conceptual Data Modelling  
*E-R Diagrams – 3 Lectures*  
Definitions, usage and examples of Conceptual Data Modeling. |
| 10 | Object-Oriented Analysis, UML. Alternative Design Strategies  
*Object-Oriented Analysis & Design – 1 Lecture*  
Object-Oriented Modeling.  
*Unified Modeling Language – 2 Lectures*  
UML, Use Cases. Examples and How to.  
*Alternative design strategies – 1 Lecture*  
Selecting the best alternative design strategy using qualitative & quantitative methods. Updating Baseline Project Plan. |
| 11 | Logical & Physical Design, Designing Forms and Reports, Designing User Interface Details  
*SDLC Design Considerations – 2 Lectures*  
Designing INPUT and OUTPUT, forms and reports, good and bad examples.  
*SDLC Design Considerations – 2 Lectures*  
Man-machine communication. User interface details. |
| 12 | Systems Implementation, Maintaining Information Systems  
   | *Implementation and Testing - 4 Lectures*  
   | Importance of suitable programming languages and a good support environment. Testing strategies. Testing tools: static and dynamic analyzers, test harnesses and test data generators, simulators.  

| 13 | Project Management  
   | *Project Management - 1 Lecture*  
   | Planning and cost estimation (review). Progress monitoring. Team structure and team management.  
   | *Quality Management - 1 Lecture*  
   | Validation, verification and testing. Quality plans. Walkthroughs, code inspections and other types of review. Role of the quality assurance group.  
   | *Configuration Management - 1 Lecture*  
   | *Engineering Standards - 1 Lecture*  
   | Software development standards in industry like MIL-STD-498, IEEE-STD-016, ISO 12207 and CMM.  

| 14 | Presentation of Term-Projects  
   | *Case Studies - 4 Lectures*  
   | Term Projects will be discussed extensively |