

National Research University Higher School of Economics

Master's Programme in Big Data Systems

System analysis & Organizational Design

Author of the Program:

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Moscow, 2015

1. Course Description

Course "System analysis & Organizational Design" is compulsory course of Big data systems curriculum.

The syllabus is prepared for teachers responsible for the course (or closely related disciplines), teaching assistants, students enrolled on the course as well as experts and statutory bodies carrying out assigned or regular accreditations in accordance with

- educational standards of the State educational budget institution of the Higher Professional Education "State University – The Higher School of Economics" (HSE) categorized as "National Research University",

- Big Data systems curriculum ("Business Informatics", area code 38.04.05.) 1rd year, 2014-2015 academic year;

- Federal state educational standard of higher education in software engineering (Bachelor of Science degree) approved by the Ministry of Education and Science of RF (Russian Federation) Directive N544 on November 9th, 2009 (in Russian).

The course is offered to students of the Master Program «Big Data Systems» (code) in the Faculty of Business Informatics of the National Research University - Higher School of Economics (HSE).

It is a two module course, which is delivered in modules #1 and #2 of the first academic year. Number of credits is 4. Total course length is 152 academic hours including 48 auditory hours (20 Lecture (L) hours and 28 Practice (P) hours) and 104 Self-study (SS) hours. Academic control forms are group project, one test after 1st module, and one exam after 2nd mod-ule.

Pre-requisites. The course is based on the knowledge of foundations of principles and skills:

- basic computer science,
- basic economic systems
- general organizational theory principle,
- enterprise architecture.

2. Learning Objectives

In business, System Analysis and Design refers to the process of examining a business situation with the intent of improving it through better procedures and methods. System analysis and design relates to shaping organizations, improving performance and achieving objectives for profitability and growth. The emphasis is on systems in action, the relationships among subsystems and their contribution to meeting a common goal.

Course is focused on understanding the role of system analysis for design of business situation. In the lab part of the course the students can try different organization design software tools. How to actually design the softer aspects of organization at the same time as designing the organizational structure with the relation to business strategy and mission, environment impact, technology changes and stakeholders influences.

3. Learning Outcomes

Knowledge	The general statements of the organizational desing methodology; the system approach for the design of software and organizational aspects ; methods of organizational changes control; the types of the uncertainty of the external environmente; the basic elements of organizational structure on the different menadgment levels (strategic, tactic, operational) ; typology of information systems that support the activities of the organization; peculiarity of IS system design and development.
Skills	To know the methods and tools of system analysis of organization for the subsequent design of organizational, functional, informational structure in terms of changes in the external (changing political, socio-economic and other conditions) and internal environment (strategy correction , innovation, etc.) organization. To know the methods and tools of group projects menadgment for the organization re-design. To know the methods and tools for the design of information systems that support the activities of the organization, and features of its reorganization in case of changes.
Practice	To be able to apply the tools and techniques of system analysis for organizational design in practice.

4. Course Plan

№	Title of the topic	Total Hours	Classroom hours		Self-study
			Lectures	Practice	
Module #1, 1st year					
1	Overview of System Analysis and Design	8	2	2	4
2	Organizational Design Fundamentals, Strategies and Technology	14	2	2	10
3	The Types of Organizational Change and Transformations due to Information Technologies	16	2	4	10
4	Business System Concepts	10	1	1	8
5	Characteristics of a System (organization, interaction, interdependence, integration)	28	3	5	20
Module #1 totals		76	10	14	52
Module #2, 1st year					
6	Elements of a System (Outputs and inputs, Processor(s), Control, Feedback, Environment, Boundaries and interface)	18	2	4	12
7	<i>Types of Systems</i>	14	2	2	10
8	<i>Systems Models (Schematic Models, Flow system Models, Static system models, Dynamic System Models)</i>	24	2	2	20
9	<i>Categories of Information</i>	11	2	4	5
10	<i>Organizational Change: Decision Making, Knowledge Management and Innovation</i>	9	2	2	5
Module #2 totals		76	10	14	52
Total:		152	20	28	104

5. Reading List

a. Required

1. Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010.
4. Naomi Stanford. Organization Design: Collaborative Approach. Elsevier, 2005. P 322
6. Harry J. Rosenblatt. Systems Analysis and Design (with CourseMate Printed Access Card) (Shelly Cashman). Cengage Learning, 10 edition, 2013.
7. Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010.

b. Optional

2. Lesson M. System Analysis and Design. Chicago: Science Research Associates, 1981.
3. Gane C., Sarson T. Structured Systems Analysis and Design. New York: Improved Systems Technologies, Inc., 1977.
5. Naomi Stanford. Guide to Organization Design: Creating high-performing and adaptable enterprises (The Economist). Bloomberg Press; 1 edition, 2007

6. Grading System. Guidelines for Knowledge Assessment

Current control: attendance record, seminar-based knowledge control, group project control;

- Intermediate control: written test by the end of Module 1, group project 1 presentation by the end of Module 2;
- Final control: exam by the end of Module 2;
- The final course grade is a sum of the following elements:
 - 1) attendance record (A);
 - 2) practice activities (S);
 - 3) group projects (P1, P2);
 - 4) written test (T);
 - 5) exam (E).

Home assignment for group project:

The course includes two group projects (one in each year of study), compulsory to all students. Students will work in groups of up to 4 students on one of the suggested topics.

First project: Research business cases : understanding the peculiarity of the corresponding organizational system and requirements of the supporting information system .

Second project: Caring through 5 phase of design .

Written tests: The written tests is a testing assignment based on the covered topics listed in the paragraph 8.

The overall and accumulated course grades G_o and G_a (10-point scale each) are calculated as follows:

$$G_a = 0.15A + 0.65S + 0.2T;$$

$$G_o = 0.7G_a + 0.3E.$$

The overall and accumulated course grades G_o and G_a (10-point scale each) include results achieved by students in their attendance record A, practice activities S, group project P, written test T and exam E; it is rounded up to an integer number of points. The rounding procedure accounts for students' practice activities during seminars. Intermediate assessment retakes are

not allowed. Conversion of the concluding rounded grade (FE) to five-point scale grade is done in accordance with the following table:

Summary Table : Correspondence of ten-point (10) to five-point (5) system's marks

Ten-point scale [10]	Five-point scale [5]
1 - unsatisfactory 2 - very bad 3 - bad	Unsatisfactory (UnS) - 2
4 - satisfactory 5 - quite satisfactory	Satisfactory (S) - 3
6 - good 7 - very good	Good (G) - 4
8 - nearly excellent 9 - excellent 10 - brilliantly	Excellent (E) - 5

7. Course Contents. Methods of Instruction

➤ Topic 1: Overview of System Analysis and Design.

◆ Outline:

- Course: Structure, the basic goals and outcomes, competences profile of the system analyst. The main area of knowledge founding the course subjects, active theorist, methodologists and practices.
- History and main idea of methodology of the organizational design based on the system analysis approach.
- Business performance management : the basic scheme and type of the IT supporting holistic strategy control of business systems
- Impact of information technology on business strategy and success.

◆ Core books (sources of information)

- Naomi Stanford. Organization Design: Collaborative Approach. Elsevier, 2005. P 322 [ch1, ch2]
- Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010. [Ch.1]
- Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010. [Ch1]

Topic 2: Organizational Design Fundamentals, Strategies and Technology

◆ Outline:

- Five phases of the organizational design model : preparing for change , choosing to re-design, creating the high-level design and the detailed designed, handling the transition; re-viewing the design.
- Useful tools each phase: concept modeling of business system, communication plane , instruments for stakeholders managing, risk control, project management ; the people planning.
- Trends in organizational design .
- The system developments live circle .
- Tools: agile approach, object oriented system Analysis and design . The principles of the choosing tools for a concrete system.

- ◆ Core books (sources of information)
 - Naomi Stanford. Organization Design: Collaborative Approach. Elsevier, 2005. P 322 [ch2-7]
 - Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010. [Ch.1]
 - Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010. [Ch2-3]

Topic 3: The Types of Organizational Change and Transformations due to Information Technologies.

- ◆ Outline:
 - Targets of Change
 - Forces for and Resistances to Change
 - The Types of Organizational Change : evolutionary , revolutionary , stability
 - Managing Change: Action Research
 - Organizational development
 - Impact of IT

◆ Core books (sources of information)

- Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010.[ch4]
- Harry J. Rosenblatt. Systems Analysis and Design (with CourseMate Printed Access Card) (Shelly Cashman). Cengage Learning, 10 edition, 2013. [ch1]
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➤ **Topic 4. Types of Systems.**

- ◆ Outline:
 - Types of enterprise information systems supporting business-system development and function: Transaction Processing Systems / Office Automation Systems and Knowledge Work Systems / Management Information Systems / Decision Support Systems / Artificial Intelligence and Expert Systems / Group Decision Support Systems and Computer- Supported Collaborative Work Systems / Executive Support Systems
 - Type of the situation of business systems development.
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◆ Core books (sources of information)

- Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010.
- Harry J. Rosenblatt. Systems Analysis and Design (with CourseMate Printed Access Card) (Shelly Cashman). Cengage Learning, 10 edition, 2013.
- Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010.

➤ **Topic 4: Business system concepts: Characteristics of a System .**

- ◆ Outline:
 - organization
 - interaction
 - interdependence
 - integration

◆ Core books (sources of information)

- Naomi Stanford. Organization Design: Collaborative Approach. Elsevier, 2005. P 322
- Naomi Stanford. Guide to Organization Design: Creating high-performing and adaptable enterprises (The Economist). Bloomberg Press; 1 edition, 2007
- Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010.

➤ **Topic 5: Elements of a System.**

◆ Outline:

- Elements of business system and information system meaning for the design effectiveness system
- Outputs and inputs: goals , recourses
- Processor(s):
- Control: levels and types (structure, parameter, informational) , fast time , in long time
- Feedback : types(control feedbacks , information feedbacks)
- Environment: stakeholders, types of external environments
- Boundaries and interface .
- Essentials of systems design

◆ Core books (sources of information)

- Naomi Stanford. Organization Design: Collaborative Approach. Elsevier, 2005. P 322
- Naomi Stanford. Guide to Organization Design: Creating high-performing and adaptable enterprises (The Economist). Bloomberg Press; 1 edition, 2007
- Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010.
- Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010. [ch11-14]

➤ **Topic 6: Systems Models.**

◆ Outline:

- Understanding and modeling organization system
- Schematic Models.
- Flow system Models.
- Static system models.
- Dynamic System Models
- Tools for Analysis process

◆ Core books (sources of information)

- Naomi Stanford. Guide to Organization Design: Creating high-performing and adaptable enterprises (The Economist). Bloomberg Press; 1 edition, 2007
- Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010.[ch7-9]
- Harry J. Rosenblatt. Systems Analysis and Design (with CourseMate Printed Access Card) (Shelly Cashman). Cengage Learning, 10 edition, 2013.

➤ **Topic 9: Categories of Information.**

◆ Outline:

- Structured , unstructured information
- Analysis of information requirements

◆ Core books (sources of information)

- Kenneth E. Kendall, Julie E. Kendall. Systems Analysis and Design. Prentice Hall, 8th ed., 2010.

➤ **Topic 10: Organizational Change: Decision Making, Knowledge Management and Innovation.**

◆ Outline:

- Organizational system development
- Supporting of development strategy

◆ Core books (sources of information)

- Naomi Stanford. Organization Design: Collaborative Approach. Elsevier, 2005. P 322
- Naomi Stanford. Guide to Organization Design: Creating high-performing and adaptable enterprises (The Economist). Bloomberg Press; 1 edition, 2007
- Gareth R. Jones. Organizational Theory, Design, and Change, 6/E, Publisher: Prentice Hall, Copyright: 2010.

8. Topics for course final quality assessment

1) Exam topics:

1. The concepts of a organizational design, organizational change.
2. Impact of information technology on business strategy and success.
3. The system approach for the design of software and organizational aspects.
4. Organizational design models.
5. Efficiency of a business-systems.
6. Types of the uncertainty of the external environment.
7. The Types of Organizational Change: target and active agents.
8. Methods of organizational changes control.
9. Business system concepts: Characteristics of a System.
10. Typology of information systems that support the activities of the organization.
11. Five phases of the organizational design model.
12. Tools of management of organizational design group project.
13. Concept modeling of business system
14. Communication plane
15. Instruments for stakeholders managing
16. Risk control in organizational design projects
17. The people planning
18. Trends in organizational design .
19. The system developments live circle .
20. Tools for IS development: agile approach, object oriented system Analysis and design .
21. The principles of the choosing tools for a concrete system.
22. Categories of Information.
23. Elements of the systems.
24. Supporting of development strategy

25. Understanding and modeling organization system
26. Schematic Models.

27. Flow system Models.
28. Static system models.
29. Dynamic System Models
30. Tools for Analysis process

To be able to apply the tools and techniques of system analysis for organizational design in practice.

2) Structure of a practical work

Task 1.

Case of business situation 1) . « Background: Mountain View College is located in New England. The school has grown rapidly and now has 8,000 students at three campuses, each with a branch bookstore. Wendy Lee, manager of college services, is responsible for all bookstore operations. Wendy wants a new information system that will increase efficiency and improve customer service.

As the case begins, Tina Allen, a systems analyst in the college's Information Technology department, is talking with David Conroe. David is majoring in information systems at Mountain View College and is earning credit toward his degree by working part-time as a student intern.»

Case of business situation 2) . Analysis of Company's Internet site. You explore the entire site, which reflects company's history, purpose, and values. You especially are impressed with the emphasis company puts on its relationships with clients. When you finish examining the site, you

are more convinced than ever that company will be a great career opportunity. You are excited about your new job, and eager to get started.

The essence of the task: Necessary to analyze the situation. Build a conceptual business model, hold the structuring of knowledge about the environment in the proposed situation, identify stakeholders. Build the organizational structure of the business. To conduct an initial examination of the information infrastructure supporting the activities of the organization..

Using the company functions and organization listed in the data library, create an organization chart using Microsoft Word, Visio, or a drawing program. What kind of IT consulting field needs in this case. Get on the Internet and find three other IT consulting firms with a brief description of each firm and the services it offers.

Tools: Interview, MS Visio or Graftio, Functional scheme of organization

Task 2. The organizational design as a team projects.

Case 2: The business situation description.

The essence of the task: Determine the composition of the team, to make the communication plan, carry out the analysis of stakeholders, the plan of the project

Tools: concept modeling of business system, communication plane , instruments for stakeholders managing, risk control, project management ; the people planning.

Task 3. Analysis of the organization in terms of latent change

Case 3. Description of the business situation, with the contradictions in the strategic objectives (for example on a particular city)¹.

The essence of the task: To make the analysis of the situation using the technique. to determine what organizational elements of the system are affected by strategy changes. To write a project plan for the reorganization and specifying stakeholders. Analysis what are the elements of

¹ Описание формируется из опыта практической работы автора программы

company IS are affected by the changes.

Case 4. To disassemble the situation of need for changes in the IS system (to support the business processes of the organization) when the consumer model changes

Task 4. Analysis of the organization in the context of internal IT changes.

Task 5. Analysis in term of internal change of business-systems

Task 6 -7. IS development

3) Writen work topics

The maturity level of tasks of organizational design in Russia

Trends in organizational design

Basic information cycle to support decision making.

The role of data analysis in the management of organizational change

On systems thinking.

The role of experts in the analysis of the system prrotsesse

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