Contest topics for Associate Professor,
position 52, 2020-2021, semester 1

Disciplines: Economic Information Systems; Basics of Programming; Programming Techniques and Algorithms.

Economic Information Systems

1. Information systems of the economic organization: system concept, system behavior, classification and role of information systems, cybernetic laws, economic organization - as a cybernetic system, methods of collaboration and resource sharing using ICT

2. Modelling of information systems: Internet, Intranet, and Extranet concepts, information system features, information system modelling phases, techniques used for modelling.

3. Communication - an element of the knowledge process: Systemic perception of the message, access to information, data quality and communication security, influences and obstacles during communication

4. Economic information: the definition and role of economic information, the qualitative dimensions of information, the life cycle of information and its characteristics, redundancy management through information re-use, information security

5. Organization of information: types of informational content, information representation, indexing and content analysis, principles of organizing and searching for information, standards of representation and data transfer

6. Electronic document management: document digitization, electronic document management, document management solutions, document management standards, document management software platforms

7. Information flows: definition and typology, electronic workflows, workflow management systems, document flow diagrams, examples

8. Digital Signature - Component of Workflows: General Concepts, Digital Signature Implementation, Digital Signature for Document Management Systems, Use of Digital Signatures - Examples

9. Social content management and social collaboration: social collaboration, social business applications, integration of social tools with business applications, sharing experience and knowledge between teams, employees, partners, customers and organizations

10. Security of information systems: security techniques and methods, security life cycle, system security challenges

11. Economic decisions: definition and classification of economic decisions, information and substantiation of economic decisions, decision making system of the organization, procedural and structural organization of the firm, strategic planning, dimensions of organizational culture

12. Enterprise Architecture (EA): EA definition, principles of EA realization, main architectural models, classification, advantages and disadvantages of using architectural models

13. Information and decisional analysis and design: what is and when the analysis is required, the methodologies that can be used, the stages of the information-decision analysis, the techniques and the tools used

Academia de Studii Economice
Departamentul de Informatică şi Cibernetică Economică
Calea Dorobanţi, 15-17, Sector 1, Bucureşti, 010552 (camera 2314)
Tel.: +40 21 319 19 00, ext. 319, 336, Fax: +40 21 311 20 66
www.dice.ase.ro

Bibliography:

1. Stoica, Marian, Sisteme informaţionale economice, ASE, 2005
2. Stoica, Marian et. al, Managementul sistemelor informaţionale, ASE, 2012
3. Stoica, Marian et. al, SharePoint 2010 pentru managementul afacerilor în societatea informaţională (ghid de seminar), ASE, Bucuresti, 2012
4. Documentation Microsoft SharePoint Server, Documenţaţie Microsoft SharePoint Server, http://office.microsoft.com/ro-ro/sharepoint-server-help/CL010257455.aspx?CTT=97
5. Documentation Microsoft SharePoint Server, Documenţaţie Microsoft SharePoint Server, http://office.microsoft.com/ro-ro/sharepoint-server-help/CL010257455.aspx?CTT=97

Basics of Programming

1. Algorithms - The role and characteristics of algorithms in the problem-solving process; Iterative and recursive; Example.
2. Algorithms - representation of algorithms (logical, pseudocode, analytical and tree); Description of the fundamental structures: linear structure, alternative structures and repetitive structures; Examples.
3. Algorithms - practical methods of structuring algorithms; errors in algorithms; design of algorithms; verifying the correctness of the algorithms; analysis of algorithms; Examples.
4. Internal organization and representation of data - information, data, knowledge - specific concepts and approaches; data and data structure; static data structures; Examples.
5. Organization and internal representation of data - dynamic data structures (basic concepts of graphs, lists, stacks and queues); Internal representation of data. Examples.
6. Stages of problem solving with computer and C programming language - General characteristics of automated data processing problems (ADPP); organizing the process of solving ADPP; General characteristics of C language - Basic language constructions (identifiers, comments, instructions, functions, program, and preprocessing directives). Examples
7. Subprograms - Subprogram building and call; Data transfer between caller and called (parameter transfer, global variable transfer); Examples
8. Data types in C - Simple data types, constants, structured data types (arrays, structures); Examples.
9. Input / output operations with keyboard / monitor in C - Format descriptors; Writing and reading functions with format; Input and output functions without format; Examples.
10. Expressions in C - Operators and Operators - arithmetic operators; logical and relational operators; bit-level operators; comma operator; the explicit conversion operator; size operator; parent brackets; the conditional operator; other operators; evaluation of phrases. Examples.
11. Achievement of fundamental control structures in C language - types of instructions; simple instructions; the composite statement; structured instructions; unconditional jump instructions and forced exit from structures. Examples.
12. Dynamic data types - Pointers - declaring and initializing pointers; use of pointers; pointer operations, link between pointers and arrays, dynamic memory allocation, const modifier, command line parameter handling. Examples.

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13. Subprograms in C language - statement and use of procedures and functions; standard subprograms; C language libraries; calling programs. Examples.

Bibliography:

1. B. Ghilic-Micu et all, Bazele programării calculatoarelor. Suport de seminar, ASE, Bucuresti, 2013
2. B. Ghilic et all, Algoritmi si scheme logice cu exemplificare in C, ASE, Bucuresti, 2017

Programming Techniques and Algorithms

1. External data organization as files
2. Text files. Sequential binary files.
3. Relative binary files.
4. Indexed binary files.
5. Algorithm complexity. Divide et Impera method.
6. Sorting algorithms: quick sort, Shell sort, counting sort, radix sort, bucket sort. Randomizing quick sort. Heaps as priority queues.
7. Greedy method.
8. Searching in solution space. Backtracking method.
9. Graphs. Definitions, representations and traversing.
10. Connectivity. Paths.
11. Applications of graph traversing: edge classification, detecting cut nodes, topological sorting.
12. Weighted graphs. Shortest (lowest cost) paths.
13. Tree graphs. Minimum spanning trees: Kruskal and Prim algorithms.

Bibliography:

1. I.Gh. Roşca, B. Ghilic-Micu, C. Cocianu, M. Stoica, C. Uscatu, M. Mircea, Programarea calculatoarelor. Algoritmi în programare, ASE, Bucuresti, 2007, România
2. C. Uscatu, M. Popa, L. Pocatilu (Bătăgan), C. Silvestru, Programarea calculatoarelor. Aplicații, ASE, Bucuresti, 2012, România
3. Thomas H. Cormen, Charles E. Leiserson, Ronald R. Rivest, Introducere în algoritmi, Computer Libris Agora, 2000, România
4. D. Knuth, Arta programării calculatoarelor(vol. 1-3), Teora, 2001, România
5. C. Uscatu, C. Cocianu, B. Ghilic-Micu, M. Stoica, M. Mircea, Algoritmi şi tehnici de programare, ASE, 2015, România
6. C. Uscatu, C. Cocianu, M, Mircea, L. Pocatilu, Algoritmi şi tehnici de programare. Aplicații, ASE, 2015, România