Course description

Name of applicant: [insert your name here]

Course of studies: [insert your course of studies here (e.g. “Information Systems”)]

University: [insert the name of the university you studied at]

Grade Average: [insert your average grade on a scale of 1 to 5 with 1 being the best, i.e. 100% = 1.0; 75% = 2.0; 0% = 5.0]

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1  [Category]

1.1  [Course: Insert your courses here]

Structure

Example (template):

1. [headline/content of chapter one]
   
   1.1. [headline/content of first subchapter]
   
   1.2. [...] 
   
   2. [headline/content of chapter one]
   
   2.1. [...] 

Literature

Example (template):

- [Surname]. [first letter of given name]. : [Surname]. [first letter of given name]. : [Title]. [Subtitle]. [Xth edition]., [place of publication] [year].

Example (applied):


Additional Information

<table>
<thead>
<tr>
<th>ECTS:</th>
<th>[insert the amount of ECTS concerning this lecture]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hours (semester periods per week):</td>
<td></td>
</tr>
<tr>
<td>Lecture:</td>
<td>[insert the amount contact hours spent for lecture]</td>
</tr>
<tr>
<td>Tutorial:</td>
<td>[insert the amount contact hours spent for tutorial]</td>
</tr>
<tr>
<td>SUM:</td>
<td>[Total amount of contact hours]</td>
</tr>
</tbody>
</table>
2 Information Systems (process modeling)

2.1 Data management

Structure

1. Conceptual data models by means of the entity-relationship-method
   1.1. Purpose of conceptual data models
   1.2. Basic elements within ERM
   1.3. Usage of cardinalities by means of the “Min-Max-notation”
      1.3.1. Syntax
      1.3.2. Combination possibilities and their interpretation
   1.4. Hierarchies and structures in an ERM
      1.4.1. Hierarchies and trees
      1.4.2. Structures and networks
   1.5. Attributes in an ERM
      1.5.1. Attributes as keys
   1.6. Multivalent relationship types
   1.7. Reinterpretation of relationship types
   1.8. Generalization and specialization in an ERM
   1.9. Special conventions of ER-modeling
      1.9.1. Denotation of relationship types
      1.9.2. The concept of “time” in an ER-model
      1.9.3. Conventions concerning cardinalities
      1.9.4. Conventions concerning generalization and specialization
2. Transformation of ER-models into data base schemata
   2.1. Transformation of entity types
   2.2. Transformation of relationship types
   2.3. Transformation of generalizations and specializations
      2.3.1. Non disjunctive – partial
      2.3.2. Non disjunctive – total
      2.3.3. Disjunctive – total
      2.3.4. Disjunctive – partial
      2.3.5. Alternative transformation approaches
3. Data base normalization
   3.1. First normal form
      3.1.1. Functional dependencies
      3.1.2. Procedure for transforming into first normal form
   3.2. Second normal form
      3.2.1. Procedure for transforming into second normal form
   3.3. Third normal form
      3.3.1. Procedure for transforming into third normal form
   3.4. Fourth normal form
      3.4.1. Multivalent dependencies
   3.5. Fifth normal form
4. Structured Query Language (SQL)
   4.1. SQL as a standard
   4.2. Purposes
   4.3. Designators
   4.4. Values
      4.4.1. Character chains
      4.4.2. Numbers
      4.4.3. NULL-values
   4.5. Data types
      4.5.1. Numerical data types
      4.5.2. Time-related data types
      4.5.3. Character chain-related data types
   4.6. Creation of tables (CREATE TABLE)
   4.7. Modification of the table structure (ALTER TABLE)
   4.8. Removal of tables (DROP TABLE)
   4.9. Insertion of data (INSERT)
      4.9.1. Direct insertion
      4.9.2. Insertion from other tables
   4.10. Queries (SELECT)
      4.10.1. Simple queries
      4.10.2. Generation of preconditions (WHERE)
      4.10.3. Sorting (ORDER BY)
      4.10.4. JOIN-syntax
      4.10.5. Data aggregation
      4.10.6. Building of groups (GROUP BY)
      4.10.7. Conditions within groups (HAVING)
      4.10.8. The order of query processing
      4.10.9. Sub-queries
   4.11. Modification of data (UPDATE)
   4.12. Deletion of data (DELETE)
5. Data base synchronization and transactions
   5.1. Synchronization of data base processes
   5.2. Transactions (ACID)
      5.2.1. Atomicity
      5.2.2. Consistency
      5.2.3. Isolation
      5.2.4. Durability
   5.3. Anomalies with competing accesses to data
      5.3.1. Dirty read
      5.3.2. Lost update
      5.3.3. Non-repeatable read
      5.3.4. Phantom read
   5.4. Serializability of transactions
      5.4.1. Read-lock and write-lock
      5.4.2. Two-phase-protocol
   6. Dispositive data management systems – data warehouses
      6.1. Structure of a data warehouse
      6.2. Established data warehouse schemata
      6.3. Data warehouse model on function specification level

Literature


Additional Information

ECTS: 5

Contact hours (semester periods per week):

- Lecture: 2
- Tutorial: 2
- SUM: 4
3 Computer Science (data modeling and software engineering)

3.1 Programming

Structure

1. Introduction
   1.1. Classification of programming languages
   1.2. Aims of programming
2. Object-oriented programming (with Java)
   2.1. First java programs and features
   2.2. Basic types and operations
   2.3. Arrays
   2.4. Control structures
   2.5. Object orientation and programming on large-scale
   2.6. Graphical user interfaces (GUI)
   2.7. Inner classes
   2.8. Exception handling
   2.9. Generic types
   2.10. Loops applied to collections
   2.11. Automated pack and upack
   2.12. Enumeration types
   2.13. Data files
   2.14. Value- vs. reference-semantics
   2.15. Java memory administration
   2.16. Applets
   2.17. Concurrency
   2.18. General programming principles
3. Declarative/functional programming (with Haskell/Curry)
   3.1. Definition of functions
   3.2. Definition of types
   3.3. Pattern-matching
   3.4. Type-inference
   3.5. Functions of a higher rank
   3.6. Lazy evaluation

This is just an exemplary lecture of the Bachelor's program at the WWU Münster.
3.7. Accumulation within parameters

4. Semantics of imperative programming languages (by means of imperative language “IMP”)
   4.1. Syntax of IMP
   4.2. Reduction-semantics of IMP
   4.3. Machine-semantics of IMP

**Literature**

Java:

Haskell:

Semantics:

**Additional Information**

**ECTS**: 10

**Contact hours** (semester periods per week):
- Lecture: 4
- Tutorial: 2
- SUM: 6

Please follow this example and add all lectures related to the field of 'Computer Science' before you continue with the second category: 'Quantitative Methods'.
4 Quantitative Methods (Operations research and statistics)

4.1 Operations research

Structure

1. Graphs and trees
   1.1. Relations and graphs
   1.2. Shortest ways within graphs
   1.3. Trees
   1.4. Critical path analysis
2. Linear optimization (linear programming)
   2.1. Basics (questions and solutions)
   2.2. Simplex algorithm
   2.3. Two-phase-method
   2.4. Sensitivity analysis
   2.5. Duality and the dual simplex algorithm
3. Integer optimization
   3.1. Linear programming including integrity constraints
   3.2. Issues of transport
   3.3. Issues of allocation
4. Decision optimization and Markov-chains
   4.1. Dynamic optimization
   4.2. Markov chains
   4.3. Markov decision processes
5. Optimization procedures
   5.1. Problem classification
   5.2. Search procedures
   5.3. Simulated annealing
   5.4. Genetic algorithms

Literature references

**Additional Information**

**ECTS:** 10  
**Contact hours** (semester periods per week):
- Lecture: 3  
- Tutorial: 2  
- Additional qualification - computer supported mathematics: 2  
- **SUM:** 7

Please follow this example and add all lectures related to the field of 'Quantitative Methods' before you continue with the second category: 'Business Administration'.
5 Business Administration

5.1 Fundamentals of accounting

Structure

1. Purpose-orientation of accounting systems
   1.1. Subcategorization of economic accountancy
   1.2. Purposes of economic accountancy
   1.3. Definitions and demarcation
2. Internal accountancy
   2.1. Tasks of cost-accounting/activity-accounting
   2.2. The structure of cost-accounting/activity-accounting
   2.3. Cost-accounting systems
   2.4. Cost-type accounting
   2.5. Cost-center accounting
   2.6. Cost-unit accounting
   2.7. Selective cost-accounting procedures
3. External accountancy
   3.1. Basics of the annual account
   3.2. Reporting procedure
   3.3. Valuation
   3.4. Profit commission statement
   3.5. Additional elements concerning the accounts of stock corporations
   3.6. Annual audit
   3.7. Financial statement analysis

Literature

**Additional Information**

**ECTS:** 10

**Contact hours** (semester periods per week):
- Lecture: 5
- Tutorial: 1
- **SUM:** 6

Please follow this example and add all lectures related to the field of 'Business Administration' in order to finalize the course description.