



# Programme Syllabus

## **Master Programme in Business Intelligence**

**120 Credits \*)**

*Masterprogram i Business Intelligence*

*120 högskolepoäng*

*Approved by the University Faculty Board, 25 October 2010  
This syllabus comes into force 1 July 2011*

\*) 1 Credit = 1 ECTS

## **1. Objectives of the Educational Programme**

### **1.1 Objectives, as Specified in the Higher Education Act (1992:1434), Chapter 1, 9 §:**

Second level education shall essentially build on the knowledge that students acquire in first level education or corresponding knowledge. Second level education shall involve a deepening of knowledge, skills and abilities relative to first level education and, in addition to what applies to first level education, shall

- further develop the students' ability to independently integrate and use knowledge ,
- develop the students' ability to deal with complex phenomena , issues and situations, and
- develop the students' potential for professional activities that demand considerable independence or for research and development work.

### **1.2 Degree Objectives, as Specified in the Higher Education Ordinance (1993:100), Appendix 2:**

#### **Master of Arts/Science (120 credits) [Masterexamen]**

##### ***Scope***

A Master of Arts/Science (120 credits) is awarded after the student has completed the courses required to gain 120 credits with a defined specialisation determined by each higher education institution itself, of which at least 60 credits are for specialised study in the principle field (main field of study) of the study programme. In addition the prior award of a Bachelor's degree, Bachelor's degree in fine arts, professional or vocational qualification of at least 180 credits or a corresponding qualification from abroad is required.

The requirement of the prior award of a qualification may be waived for a student admitted to the programme without the basic entry requirement in the form of a qualification. This does not, however, apply if a waiver was granted during admission pursuant to the second paragraph of Section 28 of the Chapter 7 of the Higher Education Ordinance (1993:100) on the grounds that the qualification had not yet been issued.

##### ***Learning Outcomes***

###### ***Knowledge and Understanding***

For a Master of Arts/Science (120 credits) the student shall have:

- demonstrated knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrated specialised methodological knowledge in the main field of study.

###### ***Competence and Skills***

For a Master of Arts/Science (120 credits) the student shall have:

- demonstrated the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations where there is limited information
- demonstrated the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as

well as the ability to evaluate this work

- demonstrated ability in speech and writing to report clearly within a national and international context and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrated the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

#### *Judgement and Approach*

For a Master of Arts/Science (120 credits) the student shall have:

- demonstrated the ability to make assessments in the main field of study informed by relevant discipline, social and ethical issues and also have demonstrated awareness of ethical aspects of research and development work
- demonstrated insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrated the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

#### *Independent Project (Degree Project)*

A requirement for the award of a Master of Arts/Science (120 credits) is completion by the student of an independent project (degree project) of at least 30 credits in the main field of study. The degree project may comprise less than 30 credits, however no less than 15 credits, if the student has already completed an independent project in the second cycle of at least 15 credits in the main field of study or equivalent from a programme of study outside Sweden.

#### *Miscellaneous*

Specific requirements determined by each higher education institution itself within the parameters of the requirements laid down in this qualification descriptor shall also apply for a Master of Arts/Science (120 credits) with a defined specialisation.

### **1.3 Objectives of the Programme**

On completion of the programme, students shall be able to:

- Demonstrate critical thinking and theoretical awareness of knowledge within the field of micro-data analysis.
- Expand and develop new insights into the modeling and analysis of data to be able to independently design and implement robust analytical models in organizations within a given time frame.
- Manage complex and large amounts of data in an organisation so as to be able to integrate and incorporate business intelligence into day to day decision making.
- Apply specialised theoretical and practical knowledge to be able to critically analyse, evaluate, synthesise and model data.
- Communicate methods, results, and knowledge using appropriate techniques to both specialists and laymen within an organization.
- Critically analyze and evaluate the relevant tools that an organization uses to better understand their business and to improve decision making.
- Demonstrate leadership, innovation and independence in situations where many

factors interact.

- Review and reflect on the social and ethical issues, norms and relationships and act to ensure and execute them. Proper care must be ensured while handling sensitive and confidential data. Typical examples include customers in a bank, credit card information, and patient information and so on.

## **2. Main Structure of the Programme**

The BI Program gives an intensive and broad training in data collection, data processing, information analysis, information modelling, decision making - so called a BI chain training system - which integrate the core components from AI, Business Data Analysis, Information Systems with Statistics principles. This design aims for students to meet increasing global challenges in careers and provide the students with competence and capability from advanced data analysis research to enterprise management skills.

The master programme in business intelligence is for students who want to gain in-depth knowledge and skills on the various activities along the business intelligence chain. Data collection, storage, analysis, report generation and decision making serve as typical examples of such activities.

A year 1 student broadens their knowledge and skills in the subject area micro-data Analysis. At the beginning of first year a number of elective courses are offered which lays the foundation for further studies on the program. Depending on previous study background two out of five elective courses are selected in period one. After period one all students on the program are expected to have a similar knowledge base for continued studies. In period two the program is separated into two directions, the first one has more focus on courses in the field of economics and the second path has more courses in computer science and statistics. To be eligible to select courses with an emphasis on computer science and statistics later in the program the course "Probability Theory and Markov Processes" in period 2 in the first year must be selected.

During the spring semester of the first year the courses focus on analysis of business data using statistical and computer science methods in a Business Intelligence context. Additionally, questions regarding data collection and quality are analysed. By the end of the first year, the foundation for how to utilize various technologies has been laid. The first year of the program provides practical skills in collecting, storing and analyzing data.

During the second year, students will mainly be trained and tested on issues relevant to data modeling and data analysis. The innate ability to take responsibility for one's own learning and managing projects is also tested. During the first half of the first semester, students will formulate a basic outline of their thesis work i.e. problem definition, hypothesis and a list of references. Students will briefly describe how they intend to solve the problem and explain what material one would build upon and describe means of accessing the same. In addition the students will outline the courses they will study in the later part of the semester bearing in mind the needs relevant to ones thesis interests. The plan will be delivered to a supervisory group for discussion and approval. During the last semester the student will pursue thesis works. It should be noted that the thesis may be methodological in nature and contribute to the development of methods and techniques in micro-data analysis; or be practical in nature aimed at

strengthening a part of an organizations' business intelligence chain .

### **3. Courses of the Programme**

All courses at advanced level belong to the main field, micro data analysis.

#### ***First Year***

##### *Term 1/Period 1*

Students choose two of the following courses:

Mathematics for microdata analysis, Undergraduate Level 2, 7.5 credits

Micro Economics, Continuation Course, Undergraduate Level 1, 7.5 credits

Introduction to Object Oriented Programming, Undergraduate Level 1, 7.5 credits

Data Analysis and Statistics, Undergraduate Level 1, 7.5 credits

Database Management, Undergraduate Level 1, 7.5 credits

##### *Term 1/Period 2*

Economics of leadership, Advanced Level 1, 7.5 credits

Students choose one of:

Probability theory and Markov processes, Advanced Level 1, 7.5 credits

Knowledge Management, Advanced Level 1, 7.5 credits

##### *Term 2 Period 3*

Artificial Intelligence, Advanced Level 1, 7.5 credits

Students choose one of:

Statistical computing with R, Advanced Level 1, 7.5 credits

Advanced Microeconomics, Advanced Level 1, 7.5 credits

##### *Term 2 Period 4*

Data Collection and Data Quality, Advanced Level 1, 7.5 credits

Business Intelligence, Advanced Level 1, 7.5 credits

#### ***Second Year***

##### *Term 1/Period 1*

Data Mining, Advanced Level 2, 7.5 credits

Students choose one of:

Linear and Generalised Linear Models, Advanced Level 1, 7.5 credits

Econometrics; Advanced Level 2, 7.5 credits

##### *Term 1/Period 2*

Students choose two of:

Advanced Statistical Modelling, Advanced Level 2, 7.5 credits

Neural Networks, Advanced Level 1, 7.5 credits

Spatial Data and Geographic Information Systems, Advanced Level 1, 7.5 credits

Intelligent agents for distributed problem solving, Advanced Level 2, 7.5 credits

Economic Geography, Advanced Level 2, 7.5 credits

*Term 2/Period 3 and 4*

Thesis work in Micro Data Analysis, Advanced Level 2, 30 credits

#### **4. Degree Awarded**

Degree of Master of Science (120 Credits), Main Field of Study: Micro- data Analysis.

#### **5. Required Entry Qualifications**

Bachelors degree or equivalent, and at least three of the following courses:

Calculus for advanced statistics, undergraduate level 2, 7.5 credits

Micro economics, undergraduate level 2, 7.5 credits

Introduction to Object Oriented Programming, undergraduate level 1, 7.5 credits

Data analysis and statistics, First cycle level 1, 7.5 credits or equivalent knowledge

Database management, 7,5 credits or equivalent knowledge

or equivalent knowledge.

In addition documented language proficiency knowledge equivalent to English B at Swedish upper secondary school.

#### **6. Other Information**

The Master Programme in Business Intelligence is given in English.

The programme's name can, on request, reports in the diploma if students have successfully completed 75% of the programme's courses and thesis work.