

Academic Programs Booklet

College of Science

2018



Prepared By: VP For Academic Programs and Graduate Studies Office

College of Science

PROGRAM COMPONENTS 2

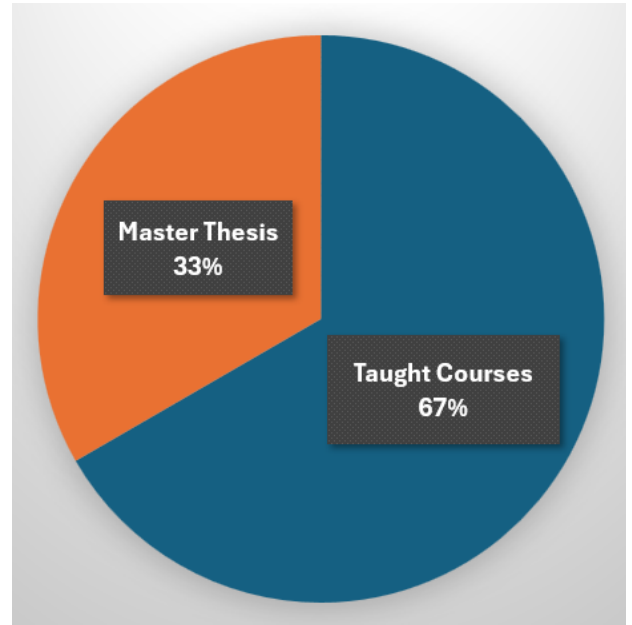
DETAILED STUDY PLAN 3

COURSE DESCRIPTION..... 4

M.Sc. in Big Data Science and Analytics

Program Components

| Course Type | CRD |
|---------------------------------|-----------|
| University Requirements (UR) | - |
| College Requirements (CR) | - |
| Major Support Requirement (MSR) | - |
| Major Requirement (MR) | 36 |
| Major Elective (ME) | - |
| Minor Requirements (MNR) | - |
| Minor Elective (MNE) | - |
| General Studies Elective (GSE) | - |
| Training (Internship) | - |
| Total Credit (CRD) | 36 |



Teaching Language: English

Detailed Study Plan

Year 1 - Semester 1

| Course Code | Course Title | Course Hours | | | Course Type | Pre-Requisite | Major CGPA | Final Exam (Yes/No) | Department Offering |
|-------------|---------------------------|--------------|------|-----|-------------|---------------|------------|---------------------|---|
| | | LEC | PRAC | CRD | | | | | |
| BDSA 601 | Research Methods | 4 | 0 | 4 | MR | NONE | Yes | No | Postgraduate Programs College of Science |
| BDSA 602 | Statistical Data Analysis | 3 | 2 | 4 | MR | NONE | Yes | Yes | Postgraduate Programs College of Science |
| BDSA 603 | Big Data Analytics | 3 | 2 | 4 | MR | NONE | Yes | Yes | Postgraduate Programs College of Science |

Year 1 - Semester 2

| Course Code | Course Title | Course Hours | | | Course Type | Pre-Requisite | Major CGPA | Final Exam (Yes/No) | Department Offering |
|-------------|----------------------------|--------------|------|-----|-------------|---------------|------------|---------------------|---|
| | | LEC | PRAC | CRD | | | | | |
| BDSA 604 | Machine Learning | 3 | 2 | 4 | MR | NONE | Yes | Yes | Postgraduate Programs College of Science |
| BDSA 605 | Data Mining | 3 | 2 | 4 | MR | NONE | Yes | Yes | Postgraduate Programs College of Science |
| BDSA 606 | Hogh Performance Computing | 3 | 2 | 4 | MR | NONE | Yes | Yes | Postgraduate Programs College of Science |

Year 2 - Semester 3

| Course Code | Course Title | Course Hours | | | Course Type | Pre-Requisite | Major CGPA | Final Exam (Yes/No) | Department Offering |
|-------------|--------------|--------------|------|-----|-------------|--|------------|---------------------|---|
| | | LEC | PRAC | CRD | | | | | |
| BDSA 609 | THESIS | 0 | 36 | 12 | MR | BDSA 601 BDSA 602 BDSA 603 BDSA 604 BDSA 605 BDSA 610 | Yes | No | Postgraduate Programs College of Science |

Course Description

| | | | | | |
|---------------------|---|-----------------|-----------|---------------|-----------------------------------|
| Course Code: | BDSA 601 | Course Credits: | (4-0-4) | Course Title: | Research Methods |
| Course Description: | The course is designed to equip students with the knowledge and transferable skills needed for a master thesis. The course covers methods of data collection, processing & analysis when conducting empirical research as well as data security and ethics associated with using open-source data. It also covers several important issues such as project management techniques, searching tools, literature review, citation, referencing, and plagiarism. The course emphasizes research-related communication skills and equips students with the skills of writing a master proposal and report as well as giving an oral presentation. The delivery mode of this course varies to span different methods such as lectures, seminars, workshops, and projects. | | | | |
| Course Code: | BDSA 602 | Course Credits: | (3-2-4) | Course Title: | Statistical Data Analysis |
| Course Description: | The course covers the concept, the underlying assumptions, and the applications of generalized linear model (GLM) and growth curves. It considers detecting and handling influential observations. The course provides students with a comprehensive knowledge about matrix representation of a model, model fit, model validation, interpretation and prediction for future observations. The course covers the experimental design and analysis, the analysis of variance (ANOVA), logistic regression, and the analysis of multidimensional contingency tables. The students will have hands-on practice using R/SPSS (or alternative recent software) as analytic tools to analyze real-world data by implementing the course topics. | | | | |
| Course Code: | BDSA 603 | Course Credits: | (3-2-4) | Course Title: | Big Data Analytics |
| Course Description: | The course provides students with a detailed knowledge about data management tools and techniques. It covers data acquisition, accessing, storing, transferring, cleaning, visualizing, and data preparation for analysis. The course covers topics of information retrieval, entity-relationship model, relational algebra, indexing, query optimization, normal forms, tuning, security, and data analytics skills in both relational and non-relational environments of big data. The course emphasizes on a project work that involves modern relational DBMS and NoSQL environments. | | | | |
| Course Code: | BDSA 604 | Course Credits: | (3-2-4) | Course Title: | Machine Learning |
| Course Description: | Knowledge about artificial learning systems, covering both supervised and unsupervised learning. The course considers various machine learning techniques: Regression and Statistical Models, Classification, Clustering, Decision Trees, Support Vector Machines, Boosting, Neural Networks, Bayesian Networks, Computational Methods, and Simulation Techniques. | | | | |
| Course Code: | BDSA 605 | Course Credits: | (3-2-4) | Course Title: | Data Mining |
| Course Description: | The course covers the concepts and techniques of data mining. It provides students with a detailed knowledge about descriptive and predictive data mining methods that can be used to extract hidden patterns from data such as visualization, classification, clustering, association, estimation, etc. Topics of handling missing data and dealing with outliers are also covered by the course. | | | | |
| Course Code: | BDSA 606 | Course Credits: | (3-2-4) | Course Title: | High Performance Computing |
| Course Description: | The course provides students with a comprehensive knowledge about the principles of high performance computing (HPC) to handle big data considering their five dimensions known as the 5Vs (Volume, Variety, Velocity, Variability, and Veracity). It covers distributed data processing with Hadoop and MapReduce, the surveys and architectures of cloud computing platforms, the scaling data science techniques and algorithms, and the performance enhancement by calculating the number of processors needed to perform a particular task. The companion practical sessions of the course focus on writing programs and building a node-compute-cluster. | | | | |
| Course Code: | BDSA 609 | Course Credits: | (0-36-12) | Course Title: | Thesis |
| Course Description: | This course is a significant independent work conducted by the master student under the supervision of academic staff as a requirement for graduation. The work represents a solving problem-oriented project that provides students with an opportunity to appreciate research skills in relation to their professional career. The thesis will be examined by a selected panel of external and internal examiners. | | | | |