UNIVERSITY OF MIAMI
FACULTY SENATE

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MEMORANDUM

To: Julio Frenk
University President

From: Linda L. Neider
Chair, Faculty Senate

Date: August 31, 2021

Subject: Faculty Senate Legislation #2021-03(B) – Curriculum Changes to the Master of Science in Data Science, Interdisciplinary Program, College of Arts and Sciences, School of Architecture, School of Communication, College of Engineering, Rosenstiel School of Marine and Atmospheric Science

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The Faculty Senate, at its August 25, 2021, meeting, had no objections to the approval of the requested curricular changes to the interdisciplinary Master of Science in Data Science that includes the College of Arts and Sciences, School of Architecture, School of Communication, College of Engineering, and Rosenstiel School of Marine and Atmospheric Science as outlined in the enclosed proposal.

The proposal is enclosed for your reference.

This legislation is now forwarded to you for your action.

LLN/rh

Enclosure

cc: Jeffrey Duerk, Executive Vice President and Provost
Leonidas Bachas, Dean, College of Arts and Sciences
Rudy el-Khoury, Dean, School of Architecture
Karin Wilkins, Dean, School of Communication
Pratim Biswas, Dean, College of Engineering
Roni Avissar, Dean, Rosenstiel School of Marine and Atmospheric Science
Mitsunori Ogihara, Professor, Director, MS in Data Science
Maryann Tobin, Assistant Dean, College of Arts and Sciences

CAPSULE: Faculty Senate Legislation #2021-03(B) – Curriculum Changes to the Master of Science in Data Science, Interdisciplinary Program, College of Arts and Sciences, School of Architecture, School of Communication, College of Engineering, Rosenstiel School of Marine and Atmospheric Science

PRESIDENT'S RESPONSE

APPROVED: _____ DATE: 9/17/21
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: Dean Bachas, Arts & Sciences, Dean Wilkins, Communication, Dean Biswas, Engineering, Dean Avissar, RSMAS _____

EFFECTIVE DATE OF LEGISLATION: IMMEDIATELY
(pending any additional approval by the Board of Trustees)

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED):_____

Program Change Request

Date Submitted: 04/02/21 7:36 pm

Viewing: MS in Data Science : MSDS_MS,TCDS_CN,SMCT_CN,MAMS_CN,DTVS_CN

Last approved: 03/20/20 11:24 am

Last edit: 08/10/21 10:50 am

Changes proposed by: Maryann Tobin (m.tatum)

Catalog Pages Using this Program

M.S. in Data Science

Please list the authors of this proposal including name, rank/title, program/department, and school.

Proposer(s) Name

Maryann Tobin, Ph.D.
Assistant Dean
College of Arts & Sciences

Mitsunori Ogihara, Ph.D.
Professor, Computer Science
Director, MS in Data Science

Effective Term: Fall 2021

First Term Valid: Spring 2021

Change Type: All Other Changes

Provide a brief summary of the change

Addition of a track in Educational Measurement & Statistics.
Addition of a track in Marketing.
Addition of the new approved CSC 712 Internship course.
Correction of Special Topics classes that have been given permanent course numbers.
Minor correction to the Smart Cities track (removal of a 500-level course no available to graduate students).
Removal of the GRE, per Grad School common practice.
Modification of RSMAS courses, as some were deactivated.

Career: Graduate

Academic Structure

School/ College	Department
College of Arts and Sciences	Computer Science

In Workflow

1. PG Initial Review
2. PG CSC Chair
3. PG AS Assoc Dean
4. PG AS GR Sr Assoc Dean
5. PG AS Faculty
6. PG AS Dean
7. PG University Accreditation
8. PG GR School
9. PG Graduate Council
10. PG GR Dean
11. Maryann Tobin
12. PG University Accreditation
13. PG FS Office for GWC
14. PG FS GWC
15. PG Faculty Senate
16. PG FS for President
17. PG FS President Approved
18. PG Registrar

Approval Path

1. 02/24/21 9:30 am Patty Murphy (pxm491): Rollback to Initiator
2. 03/10/21 9:49 am Patty Murphy (pxm491): Rollback to Initiator
3. 03/11/21 10:43 am Patty Murphy (pxm491): Approved for PG Initial Review
4. 03/17/21 2:49 pm Charles Mallery (cmallery): Approved for PG AS Assoc Dean
5. 03/18/21 9:24 am Kenneth Voss

School/ College	Department
School of Architecture	Architecture
School of Communication	Journalism & Media Management
College of Engineering	Electrical & Computer Engineering
School of Marine & Atm Science	Meteorology/Phys Oceanography
School of Education	**Educational and Psych Studies**
Miami Herbert Business School	**Marketing**

Plan Type Major and/or Degree

Degree Type Master's

Degree Name MS in Data Science

Proposed Plan Code

Proposed CIP Code

Plan Name MS in Data Science

Will there be any subcomponents within the program such as concentrations, specializations, thesis/non-thesis options, or tracks?

Yes

Subcomponents

Subcomponent Type	Subcomponent Name
Track	Individualized
Track	Technical Data Science
Track	Smart Cities
Track	Data Visualization
Track	Marine and Atmospheric Science
Track	**Educational Measurement and Statistics**
Track	**Marketing**

Program Instruction Mode In Person

Where is the program offered?

Location	Please provide the % of instruction at each location.
Coral Gables Campus	100

Program Length (Years) 2

Total Credits **30-31** ~~30~~

To Be Published in the Academic Bulletin

(voss): Approved for PG AS GR Sr Assoc Dean

6. 04/01/21 4:11 pm Maryann Tobin (m.tatum): Rollback to Initiator
7. 04/08/21 11:14 am Patty Murphy (pxm491): Approved for PG Initial Review
8. 04/08/21 12:48 pm Victor Milenkovic (vmilenkovic): Approved for PG CSC Chair
9. 04/09/21 8:21 am Charles Mallery (cmallery): Approved for PG AS Assoc Dean
10. 04/09/21 9:42 am Kenneth Voss (voss): Approved for PG AS GR Sr Assoc Dean
11. 04/09/21 9:46 am Maryann Tobin (m.tatum): Approved for PG AS Faculty
12. 04/12/21 2:54 pm Leonidas Bachas (l.bachas): Approved for PG AS Dean
13. 04/12/21 5:08 pm Patty Murphy (pxm491): Approved for PG University Accreditation
14. 04/15/21 11:06 am Tiffany Plantan (tplantan): Approved for PG GR School
15. 04/23/21 3:43 pm Tiffany Plantan (tplantan): Approved for PG Graduate Council

16. 04/25/21 11:23 am Guillermo Prado (gprado): Approved for PG GR Dean
17. 04/26/21 1:17 pm Maryann Tobin (m.tatum): Approved for m.tatum
18. 07/06/21 4:16 pm Patty Murphy (pxm491): Approved for PG University Accreditation

History

1. Mar 3, 2020 by Jenny Vargas (j.zwanziger)
2. Mar 20, 2020 by Maryann Tobin (m.tatum)

Program Overview

Program Overview

The Master of Science in Data Science is an interdisciplinary graduate program that combines the teaching of domain-specific and technical skills for analyzing large data sets. Built upon a core of foundational data science courses in Computer Science, ~~Electrical~~ Engineering, and Mathematics, and a selection of courses from data science application domains, the program is interdisciplinary in nature. Students interested in data science tools will be able to focus on tool principles and tool development, and students interested in data science application domains will be able to focus on the application of data science tools with a selection of courses that develop skills in one of three application areas. The program also provides its students the option of doing an industrial internship, to acquire professional experience. The program allows the various academic units involved to add courses in their specific application domains, thus keeping the program updated and relevant to current practice and industrial needs. the program is both academic and professional in nature, providing course that are true to a Master's level degree and courses that reflect the needs of the profession.

Program Mission and Goals

Mission

Drawing upon the University of Miami's strategic priority to foster interdisciplinary opportunities across the STEM fields, and leveraging the resources and collaboration of the Miami Institute for Data Science and **Computing (IDSC),** ~~computing,~~ the mission of the Master of Science in Data Science is to enable data science training and research, and provide applied data science and computing opportunities, for students across all disciplines.

Program Goals:

1. To teach students programming skills not only for understanding the computer programs they use but also for getting started in developing their own programs.
2. To teach students mathematical and statistical foundations sufficient for understanding the underlying algorithms and the models developed.
3. To teach students how to turn domain questions into scientific investigations and how to interpret the results in their respective domain.
4. To teach practical problem-solving skills through an internship or project.

Program Goals

~~ProgramGoals:1. To teach students programming skills not only for understanding the computer programs they use but also for getting started in developing their ownprograms.2. To teach students mathematical and statistical foundations sufficient for understanding the underlying algorithms and the models developed. 3. To teach students how to turn domain questions into scientific investigations and how to interpret the results in their respectivedomain.4. To teach practical problem-solving skills through an internship orproject.~~

Student Learning Outcomes

Effective programs focus on the design and improvement of educational experiences to enhance student learning. Expected student learning outcomes specify the knowledge, skills, values, and attitudes students are expected to attain in the program. Please include an educational mission statement for the program, educational goals/objectives for the program, and specific student learning outcomes that you will use to assess the program. Student learning outcomes should start with "Students will be able to..." or "Students will demonstrate..." or similar phrasing.

Student Learning Outcomes

Upon completion of the MS in Data Science, students will be able to:
Use mathematical, statistical, and computational techniques to analyze large datasets, including collecting data, cleaning data, integrating multiple data sets, and applying the analytical techniques to the data.
Write computer programs for accomplishing the aforementioned analysis tasks and the analysis results obtained.
Interpret domain data appropriately, and provide insights into the data at hand.
Communicate the results of their analysis clearly to the relevant people, including decision-makers, stakeholders, and managers.
Generalize data analysis skills to problems in a real-world setting.
Specific to the individual tracks.
(a) For the Technical Data Science track
Use machine learning to discover the underlying structures and relationships in large datasets.
Apply data analysis and data mining to identify patterns in large datasets and develop classification/prediction models.
Deploy appropriate tools for visualizing data and their analysis results.
(b) For the Smart Cities track:
Use data science techniques to collect and analyze data form buildings and infrastructure.
Use data analysis and visualization skills to inform the design, development, and management of sustainable and resilient environments.
(c) For the Data Visualization track:
Use interactive and static visualization techniques for communication and dissemination to audiences with diverse levels of technological background/sophistication.
Use visualization techniques for advocacy.
(d) For the Marine and Atmospheric Science track:
Use public, private data sets, and their aggregates for domain-specific inquiries.
Analyze data that covers large areas over time.
Use data science skills to develop plans for analysis and execute them.
Apply appropriate technologies to analyze marine and atmospheric data.
(e) For the Educational Measurement & Statistics track:
Demonstrate adequate mastery in the advanced statistical and measurement methodology in social and behavioral sciences.
Demonstrate adequate mastery for conducting statistical analyses and database management in social and behavioral sciences using the R and SAS programs.
(f) For the Marketing track:
Develop models to assess the sales impact of advertising and promotions.
Use models to optimize media spend on both traditional channels (TV, radio), online channels (search engines) and social media channels as well as monitor brand equity, customer satisfaction, and customer needs.
Develop models for Customer Relationship Management, dynamic pricing, revenue management, sales forecasting, sales force optimization, linking marketing actions to firm value, and balancing the trade-offs between e-Commerce and brick and mortar distribution system

Curriculum Requirements

Curriculum Requirements - General

Core Courses		
Machine Learning and Data Mining (choose 1 course)		3
~~CSC 687~~	~~Topics in Computer Science~~	
~~or ECE 648/677~~	~~Machine Learning~~	
CSC 646	**Introduction to Machine Learning with Applications**	
ECE 648	Machine Learning	
ECE 677	Data Mining	
Data Visualization (choose 1 course)		3
~~CSC 688~~	~~Topics in Computer Science~~	

~~or JMM 622~~	~~Introduction to Infographics and Data Visualization~~	
CSC 629	**Introduction to Computer Graphics**	
JMM 622	**Introduction to Infographics and Data Visualization**	
Statistics (choose 1 course)		3
EPS 700	**Quantitative Methods I**	
MTH 642	**Statistical Analysis**	
IEN 713	Applied Regression Analysis	
Data Science Tools		12
Programming (at least 3 Data Science Tool credits have to be in Programming)		
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	Introduction to Parallel Computing	
CSC 640	Algorithm Design and Analysis	
EPS 704	Computer Applications in Educational and Behavioral Science Research	
Database Systems		
CSC 623	Theory of Relational Databases	
or ECE 672	Object-Oriented and Distributed Database Management Systems	
ECE 672	**Object-Oriented and Distributed Database Management Systems**	
ECE 697	Special Topics in Electrical Engineering (Advanced Big Data Analysis)	
Data Visualization		
CSC 629	**Introduction to Computer Graphics**	
GEG 681	**Spatial Data Analysis II**	
GEG 691	**Geographic Information Systems I**	
JMM 622	**Introduction to Infographics and Data Visualization**	
JMM 629	**Advanced Infographics and Data Visualization**	
Machine Learning and Data Mining		
~~CSC 687~~	~~Topics in Computer Science~~	
CSC 646	**Introduction to Machine Learning with Applications**	
CSC 746	Neural Networks and Deep Learning	
or ECE 653	Neural Networks	
ECE 648	**Machine Learning**	
ECE 677	**Data Mining**	
ECE 730	Statistical Learning	
ECE 753	Pattern Recognition and Neural Networks	
Mathematics and Statistics		
EPS 702	**Quantitative Methods II**	
EPS 703	Applied Multivariate Statistics	
EPS 705	Measurement and Psychometric Theory	
EPS 706	Categorical Data Analysis	
~~Data Science Applications (at least 6 credits; some tracks may specify additional courses)~~		~~6-9~~
~~ARC 594~~	~~Geographic Information Systems in Urban Design~~	
~~ARC 684~~	~~Special Problems~~	
~~ARC 685~~	~~Special Problems~~	
EPS 707	**Item Response Theory**	
EPS 708	**An Introduction to Structural Equation Modeling for Multivariable Data**	
or PSY 633	**Structural Equation Modeling**	
EPS 709	**Introduction to Multilevel Modeling**	
or PSY 634	**Multilevel Modeling**	
MTH 624	**Introduction to Probability Theory**	
MTH 625	**Introduction to Mathematical Statistics**	
MTH 642	**Statistical Analysis**	
IEN 713	**Applied Regression Analysis**	

Data Science Applications		**6-9**
This is a sample list. Other electives may be chosen with approval of the MSDS Director.		
ARC 686	**Special Problems**	
ARC 694	**Geographic Information Systems in Urban Design**	
ARC 695	**Interactive Multimedia in Design**	
ARC 697	**Designing for the Internet of Things**	
ATM 774	**Advanced Studies**	
CSC 645	Introduction to Artificial Intelligence	
CSC 670	**Directed Reading**	
CSC 686	Topics in Computer Science	
ECE 637	**Principles of Artificial Intelligence**	
EPS 711	**Advanced Topics in Research, Measurement, and Evaluation**	
GEG 680	Spatial Data Analysis I - COURSE PROPOSAL IN PROGRESS	
GEG 681	**Spatial Data Analysis II**	
GEG 691	**Geographic Information Systems I**	
GEG 692	**Remote Sensing of the Environment**	
GEG 693	**Geographic Information Systems II**	
GEG 695	**Web GIS**	
JMM 692	Special Topics in Journalism and Media Management	
~~Internship/Capstone~~		~~3-6~~
~~Total Credit Hours~~		~~30~~
MPO 606	**Introduction to Ocean Remote Sensing**	
MPO 707	**Advanced Ocean Remote Sensing**	
Capstone		**3-6**
Total Credit Hours		30

Curriculum Requirements - Technical Data Science Track

Core		9
Data Science Tools (choose one course from each domain)		12
Programming		
~~CSC 686~~	~~Topics in Computer Science~~	
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	Introduction to Parallel Computing	
CSC 640	Algorithm Design and Analysis	
Database Systems		
CSC 623	Theory of Relational Databases	
~~ECE 697~~	~~Special Topics in Electrical Engineering~~	
ECE 672	**Object-Oriented and Distributed Database Management Systems**	
Data Analysis		
ECE 697	Special Topics in Electrical Engineering	
ECE 677	Data Mining	
Statistics		
MTH 624	Introduction to Probability Theory	
MTH 625	Introduction to Mathematical Statistics	
~~Data Science Application/Electives~~		~~6~~
~~Internship/Capstone~~		~~3~~
Data Science Applications		**3-6**
Capstone		**3-6**
CSC 712	**Computer Science Graduate Internship**	
or CSC 670	**Directed Reading**	

Total Credit Hours	30

Curriculum Requirements - Smart Cities Track

Core		9
Data Science Tools (3 credits must be taken in Programming)		9
Programming Courses		
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	**Introduction to Parallel Computing**	
CSC 640	**Algorithm Design and Analysis**	
Students may choose from other courses throughout the MSDS curriculum to satisfy the Data Science Tools requirement, with advisor approval.		
Data Science Applications		6-9
~~ARC 594~~	~~Geographic Information Systems in Urban Design~~	
ARC 694	Geographic Information Systems in Urban Design	
~~ARC 686~~	~~Special Problems~~	
~~Internship/Capstone~~		~~3~~
ARC 696	**Advanced Topics**	
ARC 697	**Designing for the Internet of Things**	
Capstone		**3-6**
CSC 712	**Computer Science Graduate Internship**	
or ARC 686	**Special Problems**	
Total Credit Hours		30

Curriculum Requirements - Data Visualization Track

Core		9
Data Science Tools (3 credits must be taken in Programming)		9
Programming Courses		
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	**Introduction to Parallel Computing**	
CSC 640	**Algorithm Design and Analysis**	
Students interested in spatial visualization may also take any of the following electives:		
Data Science Applications		6-9
~~CSC 688~~	~~Topics in Computer Science~~	
CSC 629	**Introduction to Computer Graphics**	
GEG 681	Spatial Data Analysis II	
GEG 691	Geographic Information Systems I	
GEG 692	Remote Sensing of the Environment	
~~GEG 680~~	~~Spatial Data Analysis I - COURSE PROPOSAL IN PROGRESS~~	
GEG 693	**Geographic Information Systems II**	
JMM 622	Introduction to Infographics and Data Visualization	
JMM 692	Special Topics in Journalism and Media Management	
~~Internship/Capstone~~		~~3~~
Capstone		**3-6**
CSC 712	**Computer Science Graduate Internship**	
or JMM 692	**Special Topics in Journalism and Media Management**	
Total Credit Hours		30

Curriculum Requirements - Marine and Atmospheric **Sciences Track**

Core	9

Data Science Tools (3 credits must be taken in Programming)		3
~~CSC 686~~	~~Topics in Computer Science~~	
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	Introduction to Parallel Computing	
CSC 640	Algorithm Design and Analysis	
Data Science Applications		12-15
~~OCE 642~~	~~Course OCE 642 Not Found - COURSE DEACTIVATION IN PROGRESS~~	
~~OCE 686~~	~~Course OCE 686 Not Found - COURSE DEACTIVATION IN PROGRESS~~	
~~OCE 642~~	~~Course OCE 642 Not Found - COURSE DEACTIVATION IN PROGRESS~~	
~~OCE 687~~	~~Course OCE 687 Not Found - COURSE DEACTIVATION IN PROGRESS~~	
Includes the remaining 6 credits of Data Science Tools material.		
ATM 624	**Applied Data Analysis**	
or MPO 624	**Applied Data Analysis**	
MPO 606	**Introduction to Ocean Remote Sensing**	
MPO 707	**Advanced Ocean Remote Sensing**	
MES 660	Introduction to Marine Geographic Information Systems	
MES 661	Introduction to Marine Geographic Information Systems - Laboratory	
MPO 771	**Advanced Studies**	
Or any other courses selected from the concentration course lists for the RSMAS Master of Professional Science (MPS), with advisor approval		
~~Internship/Capstone~~		~~3~~
Capstone		**3-6**
CSC 712	**Computer Science Graduate Internship**	
or ATM 774	**Advanced Studies**	
Total Credit Hours		30

Curriculum Requirements - Educational Measurement and Statistics Track

Core		**9**
Data Science Tools (3 credits must be taken in Programming)		
Programming Courses		**3**
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	**Introduction to Parallel Computing**	
CSC 640	**Algorithm Design and Analysis**	
Mathematics and Statistics Courses		**9**
EPS 700	**Quantitative Methods I**	
EPS 701	**Introduction to Research Methods**	
EPS 702	**Quantitative Methods II**	
EPS 703	**Applied Multivariate Statistics**	
EPS 705	**Measurement and Psychometric Theory**	
EPS 706	**Categorical Data Analysis**	
EPS 708	**An Introduction to Structural Equation Modeling for Multivariable Data**	
or PSY 633	**Structural Equation Modeling**	
EPS 709	**Introduction to Multilevel Modeling**	
or PSY 634	**Multilevel Modeling**	
EPS 710	**Meta-Analytic Methods for Research Synthesis**	
Data Science Applications		**3-6**
EPS 704	**Computer Applications in Educational and Behavioral Science Research**	
EPS 707	**Item Response Theory**	
EPS 711	**Advanced Topics in Research, Measurement, and Evaluation**	

Capstone		**3-6**
CSC 712	**Computer Science Graduate Internship**	
or EPS 798	**Advanced Individual Study**	
Total Credit Hours		30

Curriculum Requirements - Marketing Track

Please note: ~~Sciences~~ The MSDS Marketing Track requires 31 credits.

Core		**9**
Data Science Tools (3 credits must be taken in Programming)		
Programming Courses		**3**
CSC 615	**Introduction to Python Programming for Graduate Students - COURSE PROPOSAL IN PROGRESS**	
CSC 632	**Introduction to Parallel Computing**	
CSC 640	**Algorithm Design and Analysis**	
Marketing Courses		**8**
MKT 640	**Foundations of Marketing Management**	
MKT 641	**Marketing Research and Decision Making**	
MKT 646	**Consumer Behavior**	
MKT 675	**Marketing Analytics**	
Data Science Applications		**6-8**
includes the remaining 1 credit of Data Science Tools material.		
MKT 647	**Advertising and Communications Management**	
MKT 648	**New Product Development**	
MKT 649	**Strategic Brand Marketing**	
MKT 650	**Strategic Marketing**	
MKT 677	**Strategic Digital Media Management**	
Capstone		**3-6**
CSC 712	**Computer Science Graduate Internship**	
or MKT 699	**Directed Study**	
Total Credit Hours		31

Plan of Study

Sample Plan of Study - General

Plan of Study Grid

Year One		
Fall		Credit Hours
~~CSC 687~~	~~Topics in Computer Science (or another approved Data Science Tools course)~~	~~3~~
~~CSC 688~~	~~Topics in Computer Science (or another approved Data Visualization course)~~	~~3~~
CSC 615	**Introduction to Python Programming for Graduate Students (or another approved Programming course)**	**3**
JMM 622	**Introduction to Infographics and Data Visualization (or another approved Data Visualization course)**	**3**
CSC 646	**Introduction to Machine Learning with Applications (another approved Data Science Tools course)**	**3**
MTH 642	Statistical Analysis (or another approved statistics course)	3
~~CSC 686~~	~~Topics in Computer Science (or another approved Programming course)~~	~~3~~
	Credit Hours	12
Spring		
CSC 632	Introduction to Parallel Computing (or another approved Programming course)	3
CSC 623	Theory of Relational Databases (or another approved Database Systems course)	3
CSC 746	Neural Networks and Deep Learning (or another approved Machine Learning or Data Mining course)	3
EPS 703	Applied Multivariate Statistics (or another approved Statistics course)	3

	Credit Hours	12
Summer		
~~CSC 793~~	~~Research Project (or internship experience)~~	~~3~~
~~CSC 794~~	~~Research Project (or internship experience)~~	~~3~~
CSC 712	**Computer Science Graduate Internship**	**6**
	Credit Hours	6
	Total Credit Hours	30

Sample Plan of Study - Technical Data Science

Plan of Study Grid

Year One		
Fall		Credit Hours
~~CSC 687~~	~~Topics in Computer Science (or another approved Data Science Tools course)~~	~~3~~
~~CSC 688~~	~~Topics in Computer Science (or another approved Data Visualization course)~~	~~3~~
CSC 615	**Introduction to Python Programming for Graduate Students**	**3**
JMM 622	**Introduction to Infographics and Data Visualization (or another approved Data Visualization course)**	**3**
CSC 646	**Introduction to Machine Learning with Applications (another approved Data Science Tools course)**	**3**
MTH 642	Statistical Analysis (or another approved statistics course)	3
~~CSC 686~~	~~Topics in Computer Science (or another approved Programming course)~~	~~3~~
	Credit Hours	12
Spring		
CSC 623	Theory of Relational Databases (or another approved Database Systems course)	3
ECE 697 or 677	Special Topics in Electrical Engineering or Data Mining	3
MTH 624 or 625	Introduction to Probability Theory or Introduction to Mathematical Statistics	3
CSC 645	Introduction to Artificial Intelligence (or another approved Data Science Applications course)	3
	Credit Hours	12
Summer		
~~GEG 680~~	~~Spatial Data Analysis I~~	~~3~~
~~CSC 793~~	~~Research Project (or internship experience)~~	~~3~~
CSC 712	**Computer Science Graduate Internship**	**6**
	Credit Hours	6
	Total Credit Hours	30

Sample Plan of Study - Smart Cities

Plan of Study Grid

Year One		
Fall		Credit Hours
~~CSC 687~~	~~Topics in Computer Science (or another approved Data Science Tools course)~~	~~3~~
~~CSC 688~~	~~Topics in Computer Science (or another approved Data Visualization course)~~	~~3~~
CSC 615	**Introduction to Python Programming for Graduate Students (or another approved Programming course)**	**3**
JMM 622	**Introduction to Infographics and Data Visualization (or another approved Data Visualization course)**	**3**
CSC 646	**Introduction to Machine Learning with Applications (another approved Data Science Tools course)**	**3**
MTH 642	Statistical Analysis (or another approved statistics course)	3
~~CSC 686~~	~~Topics in Computer Science (or another approved Programming course)~~	~~3~~
	Credit Hours	12
Spring		
ARC 594	Geographic Information Systems in Urban Design	3
ARC 684	Special Problems	3

ARC 685	Special Problems	3
ARC 697	Designing for the Internet of Things (or another approved ARC elective)	3
	Credit Hours	12
Summer		
~~ARC 701 or 810~~	~~Masters Final Project or Master's Thesis~~	~~6~~
CSC 712	**Computer Science Graduate Internship**	**6**
	Credit Hours	6
	Total Credit Hours	30

Sample Plan of Study - Data Visualization

Plan of Study Grid

Year One		
Fall		Credit Hours
~~CSC 687~~	~~Topics in Computer Science (or another approved Data Science Tools course)~~	~~3~~
~~CSC 688~~	~~Topics in Computer Science (or another approved Data Visualization course)~~	~~3~~
CSC 615	**Introduction to Python Programming for Graduate Students (or another approved Programming course)**	**3**
JMM 622	**Introduction to Infographics and Data Visualization (or another approved Data Visualization course)**	**3**
CSC 646	**Introduction to Machine Learning with Applications (or another approved Data Science Tools course)**	**3**
MTH 642	Statistical Analysis (or another approved statistics course)	3
~~CSC 686~~	~~Topics in Computer Science (or another approved Programming course)~~	~~3~~
	Credit Hours	12
Spring		
JMM 622 or CSC 688	Introduction to Infographics and Data Visualization or Topics in Computer Science	3
JMM 692	Special Topics in Journalism and Media Management	3
JMM 663	Applied Data Analytics for Journalism and Media Management (or another approved Data Visualization elective)	3
JMM 696	Special Topics in Visual Journalism (or another approved Data Visualization elective)	3
	Credit Hours	12
Summer		
~~JMM 815~~	~~Multimedia Project~~	~~6~~
CSC 712	**Computer Science Graduate Internship**	**6**
	Credit Hours	6
	Total Credit Hours	30

Sample Plan of Study - Marine and Atmospheric Science

Plan of Study Grid

Year One		
Fall		Credit Hours
~~CSC 687~~	~~Topics in Computer Science (or another approved Data Science Tools course)~~	~~3~~
~~CSC 688~~	~~Topics in Computer Science (or another approved Data Visualization course)~~	~~3~~
~~MTH 642~~	~~Statistical Analysis (or another approved statistics course)~~	~~3~~
~~CSC 686~~	~~Topics in Computer Science (or another approved Programming course)~~	~~3~~
CSC 615	**Introduction to Python Programming for Graduate Students (or another approved Programming course)**	**3**
JMM 622	**Introduction to Infographics and Data Visualization (or another approved Data Visualization course)**	**3**
CSC 646	**Introduction to Machine Learning with Applications (another approved Data Science Tools course)**	**3**
MPO 606	**Introduction to Ocean Remote Sensing**	**3**
	Credit Hours	12

Spring		
MES 660	Introduction to Marine Geographic Information Systems (or another approved Marine & Atmospheric Science elective)	3
~~OCE 642~~	~~Course OCE 642 Not Found (or another approved Marine & Atmospheric Science elective)~~	~~3~~
~~OCE 643~~	~~Physics of Remote Sensing II - Active Systems (or another approved Marine & Atmospheric Science elective)~~	~~3~~
~~OCE 686~~	~~Course OCE 686 Not Found (or another approved Marine & Atmospheric Science elective)~~	~~3~~
ATM 624	**Applied Data Analysis**	**3**
MPO 707	**Advanced Ocean Remote Sensing**	**3**
MTH 642	**Statistical Analysis (or another approved statistics course)**	**3**
	Credit Hours	12
Summer		
~~OCE 805~~	~~MPS Internship~~	~~6~~
CSC 712 or ATM 774	**Computer Science Graduate Internship or Advanced Studies**	**6**
	Credit Hours	6
	Total Credit Hours	30

Sample Plan of Study - Educational Measurement and Statistics

Plan of Study Grid

Year One		
Fall		Credit Hours
CSC 615	**Introduction to Python Programming for Graduate Students**	**3**
CSC 646	**Introduction to Machine Learning with Applications**	**3**
EPS 700	**Quantitative Methods I**	**3**
EPS 701	**Introduction to Research Methods**	**3**
	Credit Hours	12
Spring		
CSC 629	**Introduction to Computer Graphics**	**3**
EPS 705	**Measurement and Psychometric Theory**	**3**
EPS 711	**Advanced Topics in Research, Measurement, and Evaluation**	**3**
EPS 703 or 704	**Applied Multivariate Statistics or Computer Applications in Educational and Behavioral Science Research**	**3**
	Credit Hours	12
Summer		
EPS 703 or 704	**Applied Multivariate Statistics or Computer Applications in Educational and Behavioral Science Research**	**3**
CSC 712 or EPS 798	**Computer Science Graduate Internship or Advanced Individual Study**	**3**
	Credit Hours	6
	Total Credit Hours	30

Sample Plan of Study - Marketing

Plan of Study Grid

Year One		
Fall		Credit Hours
Full Term Fall A/B		
CSC 615	**Introduction to Python Programming for Graduate Students**	**3**
JMM 622	**Introduction to Infographics and Data Visualization**	**3**
Fall A 1		
MKT 640	**Foundations of Marketing Management**	**2**

MKT 641	**Marketing Research and Decision Making**	**2**
Fall B		
MKT 646	**Consumer Behavior**	**2**
MKT 647	**Advertising and Communications Management**	**2**
	Credit Hours	14
Spring		
Full Term Spring A/B		
CSC 646	**Introduction to Machine Learning with Applications**	**3**
EPS 702	**Quantitative Methods II**	**3**
Spring A		
MKT 649	**Strategic Brand Marketing**	**2**
MKT 677	**Strategic Digital Media Management**	**2**
Spring B		
MKT 650	**Strategic Marketing**	**2**
MKT 675	**Marketing Analytics**	**2**
	Credit Hours	14
Summer		
CSC 712 or MKT 699	**Computer Science Graduate Internship or Directed Study**	**3**
	Credit Hours	3
	Total Credit Hours	31

1 MKT courses are 2-credit courses offered in 7-week A & B sessions throughout the Fall and Spring terms.

Admission Requirements

Admission Requirements

1. Completion of an application.
2. ~~2.~~ A Baccalaureate degree **from a regionally** ~~for an~~ accredited **institution or foreign equivalent.** ~~institution.~~
3. ~~3.~~ A minimum cumulative undergraduate GPA of 3.0.
4. **Three letters of recommendation.**
5. **Official transcripts from each post-secondary institution attended. Official transcripts in languages other than English must also be submitted with a certified English translation.**
6. ~~4.~~ Introduction to Probability and **Statistics, Linear Algebra,** ~~Statistics~~ and Computer Programming I (or equivalents). Students **who require prerequisite courses will** ~~may~~ be admitted **as non-degree seeking. Upon passing any required prerequisite courses** with **a grade of "B" or better,** ~~deficiencies, which must be completed in addition to~~ the **student would then be eligible for admission to the M.S.** ~~degree requirements.~~ **program the following semester.**

~~5. GRE general test scoresApplicants must rank in the 65% percentile or higher in the Quantitative Reasoning Test. There is no minimum score requirement for other parts of theGRE.~~**7.** ~~6.~~ Students from non-English speaking countries must send either TOEFL or IELTS

TOEFL minimum score: Internet based - 92; Computer based - 237; Paper based 580

IELTS minimum score: 6.5

8. ~~7.~~ A personal statement of intent in which the applicant details **their** reasons for pursuing **this** ~~the~~ degree.

Rationale

Rationale

After the successful launch of the Master of Science in Data Science, the College of Arts & Sciences was approached by the School of Education and Human Development and the Miami Herbert Business School to add tracks in Educational Measurement & Statistics and Marketing, respectively. Both departments supported the initial creation of the program and agreed to provide coursework in the original curriculum. Dr. Soyeon Ahn of the EPS department and Dr. Joseph Johnson of the Marketing department will be added to the MSDS Advisory Board.
Additionally, during the approval of the MSDS, the Graduate School allowed programs to vote to remove the GRE requirement for admissions, which the MSDS has elected to do.
Lastly, some of the special topics courses have been given permanent numbers and an internship course was created to support the capstone experience of the MSDS students.

Job Market Demand and Outlook

The MSDS is introducing two additional tracks to expand our interdisciplinary offerings in key areas of data science: Educational Measurement & Statistics and Marketing.
Marketing is the one business area that is transforming because of the emergence of Big Data and AI technologies. To succeed as marketing professionals, future marketers will need to know not only the time-tested marketing fundamentals but also how to effectively deploy these modern technologies and tools. This track prepares students for successful careers in an increasingly competitive, dynamic, global, and service- and technology-oriented environment.
The addition of a track in Educational Measurement & Statistics is more of a practical matter, as the School of Education & Human Development intends to close their M.S.Ed. in Research, Measurement, & Evaluation simultaneously, while continuing to offer the same courses for their Ph.D. students and the MSDS students. Graduates from this track will be acquire knowledge to use the appropriate software required for data management and statistical analyses relevant to research and evaluations conducted in educational, psychological, health, and human service environments. Across the many facets of education, from K-12 to higher ed and beyond, there is a need for data analysts, research coordinators, and measurement advisors who can work in a variety of industrial and academic settings. This track includes coursework in general linear models, multivariate statistics, structural equation modeling, multilevel modeling, psychometric theory, data management, and statistical programming using R, SPSS, SAS, or Mplus.

Relationship to Other UM Academic Programs

The track in Educational Measurement and Statistics was agreed to as part of the inclusion of EPS courses in the original MSDS proposal. (Please see Faculty Senate Legislation 2019-38(B), pg 26-27 of the proposal). This track would replace the suspended MSEd in Research, Measurement, and Evaluation.
In addition, there is not currently a masters-level program in Marketing offered by the Miami Herbert Business School. This collaboration would fill that void.

Relationship to Undergraduate and Professional Programs

N/A

Library, Facilities, Equipment and Other Resources Available and Needed to Support the Program

The MSDS is already equipped to support these new tracks. No additional library resources are needed.

Laboratory Facilities, Equipment, and Space Available and Needed to Support the Program

N/A

Other Resources Available or Needed to Support the Program

N/A

Curriculum

Program Curriculum

Both new tracks rely on existing courses already offered through their respective schools.
Please note that because of the difference in credit load for courses at the Miami Herbert Business School, the Marketing track requires 31 credit hours.

Upload Syllabi for Any New Courses

Proposed Schedule of Course Offerings for the First Three Years

Faculty

Program Directors

Dr. Soyeon Ahn of the EPS department and Dr. Joseph Johnson of the Marketing department will be added to the MSDS Advisory Board. They will oversee the new tracks and advise students in those tracks. The remaining MSDS faculty leadership remains the same, with Dr. Mitsunori Ogihara as MSDS Director.
Support letters from Dr. Ahn, Dr. Michael Tsiros (Chair, MKT Dept), Dean Quelch and Dean Kohn-Wood are included with this proposal.

Upload CV(s) ahnfile.pdf
johnson-cv.pdf

Program Faculty

Upload CV(s) Grad

Students

Applicant Pool

Students in the proposed Marketing track would most likely come from undergraduate backgrounds in business administration, marketing, advertising, public relations, management, business technology, and communication.
Students in the proposed Educational Measurement & Statistics track would most likely come from undergraduate backgrounds in teaching and learning, higher education, mathematics, psychology, sociology, and statistics,.

Enrollment Projections

The MSDS program continues to grow. The second year, enrollment is projected to double from 15 to 30-35. We anticipate the addition of these two tracks to add approx 15-20 additional students.

Teaching or Research Assistants

N/A

Administration

Program Administration

The MSDS program will remain under the administration of the College of Arts & Sciences' Office of Interdisciplinary and Professional Studies.

Comparison

Peer Comparisons

Related to Marketing:
DePaul University: MS in Data Science, Marketing Concentration (52 credits)
Emerson: MS in Digital Marketing & Data Analytics, Online (30 credits)
Univ. of Alabama: MS in Marketing Analytics (30 credits)
American University: MS in Marketing Analytics (30 credits)
Related to Educational Measurement & Statistics:
Stanford: Masters in Educational Data Science (51 credits)
Univ. of Massachusetts: MSEd in Data Analysis, Assessment, and Research in Education (36 credits)
Columbia: Ed.M. in Measurement and Evaluation (60 credits), MS in Learning Analytics (30 credits)
Univ of Illinois: MEd in Measurement, Evaluation, and Statistics

Documents

Attach Supporting Documentation
MSDS Tracks Documentation.pdf
comp-support.pdf
ARCH - MS of Data Science.pdf
RSMAS Mapes Letter.pdf
ECE-engg support.pdf

Reviewer Comments

Maryann Tobin (m.tatum) (04/01/21 4:11 pm): Rollback: To correct MKT track Plan of Study
Charles Mallery (cmallery) (04/09/21 8:21 am): The Curriculum Committee of the College of Arts & Sciences in accordance with the College's By-Laws amended April 5, 2021 and acting on behalf of the College Council approved the program changes to the M.S> in Data Science.
Kenneth Voss (voss) (04/09/21 9:42 am): I approve this change
Maryann Tobin (m.tatum) (04/09/21 9:46 am): At a regular meeting of the College of Arts & Sciences faculty on Monday April 5, 2021, this proposal was unanimously approved.
Leonidas Bachas (l.bachas) (04/12/21 2:54 pm): The Arts and Sciences faculty voted to approve this proposal on April 5, 2021. I support the proposed program change
Patty Murphy (pxm491) (04/12/21 5:08 pm): The two new tracks are just repackaging of existing courses. The other curricular changes also involve existing courses. Therefore these changes do not represent a substantive change and do not require notification to or approval from SACSCOC.
Tiffany Plantan (tplantan) (04/23/21 3:43 pm): Proposal was discussed at the April 20, 2021 meeting of the Graduate Council. Notification items only. No concerns were expressed by Council members.
Maryann Tobin (m.tatum) (04/26/21 1:17 pm): I made the corrections to the Admissions Requirements, per the Graduate Council. Forwarding this proposal to GWC for their review.
Robyn Hardeman (rhardeman) (08/06/21 2:14 pm): 8/6/21, Communication, Chair of Journalism and Media Management Sam Terilli sent email noting no objections to the changes and that he fully approves.
Robyn Hardeman (rhardeman) (08/10/21 12:19 pm): Attached letters of support from: Dean, Arts and Sciences Dean, Architecture Dean, Ed & Human Dev. Chairs: Ed and Psyc Studies, Comp Science, Electrical and Computer Engineering. Grad Program director: RSMAS

Key: 529

UNIVERSITY OF MIAMI
MIAMI HERBERT
BUSINESS SCHOOL

Date: December 8, 2020

To: Dr. Leonidas Bachas, Dean
College of Arts & Sciences

From: Michael Tsiros
Chair, Department of Marketing

Subject: Letter of Support for the Proposal to Establish a Marketing Track in the M.S. in Data Science

I am writing to express support for the Proposal to Establish a track in Marketing for the existing Master of Science in Data Science program.

The faculty of the Department of Marketing voted on March 4 to unanimously support this new track and have agreed to offer selected MKT courses, with the core courses being taken through the College of Arts & Sciences. The MS in Data Science is a unique, interdisciplinary degree and the Miami Herbert Business School is pleased to be joining other units across the university to provide coursework for this program.

We are looking forward to a strategic partnership with this new degree program, and we look forward to collaborating in the future through events, recruitment, and interdisciplinary projects.

Sincerely,

Michael Tsiros Ph.D.

UNIVERSITY OF MIAMI
SCHOOL of EDUCATION
& HUMAN DEVELOPMENT

Educational & Psychological Studies
5202 University Drive Merrick Bldg.
Suite 310-G
Coral Gables, FL 33146

DATE: February 26, 2021

FROM: Soyeon Ahn, Ph.D.
Chair, Department of Educational & Psychological Studies (EPS)
School of Education and Human Development

SUBJECT: Memo from the Department Chair for supporting the addition of a new Concentration in Measurement and Statistics in Education and Social Sciences (MSES) in the M.S. in Data Science program

As a chair of the Department of Educational and Psychological Studies (EPS) in the School of Education and Human Development (SEHD), I offer my support for adding a new Concentration in ***Measurement and Statistics in Education and Social Sciences (MSES)*** in the Master of Science (MS) in Data Science housed in the College of Arts and Sciences.

Upon the addition of MSES concentration into MS in Data Science program, we have suspended the admission of students into the Master of Science in Research, Measurement, and Evaluation program housed in EPS. The UM office of accreditation has notified the suspension of admission to the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

The EPS department will offer the relevant courses to all students in the MS in Data Science program.

Soyeon Ahn, Ph. D.
Chair, Department of Educational & Psychological Studies (EPS)
School of Educational and Human Development

cc: Laura Kohn-wood, Dean, School of Education and Human Development
Walter Secada, Vice Dean, School of Education and Human Development

UNIVERSITY OF MIAMI
SCHOOL of EDUCATION
& HUMAN DEVELOPMENT

Office of the Dean
Laura Kohn-Wood, Ph.D.
Dean and Professor
Educational and Psychological Studies

P.O. Box 248065
Coral Gables, FL 33124-2040
Phone: 305-284-3505
Fax: 305-284-3003
www.education.miami.edu

MEMORANDUM

DATE: March 1, 2021

FROM: Laura Kohn-Wood
Dean, School of Education and Human Development

SUBJECT: Support of new track in MS in Data Science

As Dean of the School of Education and Human Development (SEHD), I support the addition of the new track, Educational Measurement and Statistics, in the Master of Science in Data Science (MSDS) program housed in the College of Arts and Sciences.

Upon the addition of the new track into the MS in Data Science program, we have suspended the admission of students into the MS in Research, Measurement, and Evaluation program housed in the Department of Educational and Psychological Studies (EPS). The University's Office of Accreditation has notified the Southern Association of Colleges and Schools Commission on Colleges of the suspension of admissions.

The EPS department will offer the relevant courses to all students in the MS in Data Science program.

Should you have any questions feel free to contact me at via email at l.kohnwood@miami.edu.

UNIVERSITY OF MIAMI
MIAMI HERBERT
BUSINESS SCHOOL

Date: December 8, 2020

To: Leonidas G. Bachas
Dean, College of Arts & Sciences

From: John Quelch
Dean, Miami Hebert Business School

Subject: Letter of Support for the Proposal to Establish a Marketing Track in the M.S. in Data Science

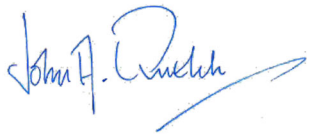
I am very pleased to write a letter in support of the proposed Marketing concentration for the Master of Science in Data Science.

The interdisciplinary importance of data science relies on connections and learning opportunities across all aspects of data analysis and computing, and we are grateful to the College of Arts & Sciences for their innovation and leadership in developing this degree program.

The Miami Hebert Business School is a committed to developing transformative leaders that redefine business and scholarship. Partnerships like this allow students to understand specific applications for data science tools in key areas of business and management. These cross-disciplinary opportunities have great promise and will impact students' future practice, employment, and scholarly work.

Please accept my full support for this proposal.

Regards



Dr. John A. Quelch, Leonard M. Miller University Professor
Vice Provost, University of Miami
Dean, Miami Herbert Business School

UNIVERSITY OF MIAMI
COLLEGE of
ARTS & SCIENCES

Department of Computer Science
P.O. Box 248154
Coral Gables, Florida 33124-4245

Ph: 305-284-2268
Fax: 305-284-2264

MEMORANDUM

To: Patty Murphy, Associate Provost, University Accreditation

From: Victor Milenkovic, Chair, Department of Computer Science

Subject: Changes to Master of Science in Data Science

Date: August 5, 2021

On August 4, 2021, the faculty of the Department of Computer Science voted to approve the following changes to the Masters of Science in Data Science program:

- Addition of a track in Educational Measurement & Statistics.
- Addition of a track in Marketing.
- Addition of the new approved CSC 712 Internship course.
- Correction of Special Topics classes that have been given permanent course numbers.
- Minor correction to the Smart Cities track (removal of a 500-level course no available to graduate students).
- Removal of the GRE, per Grad School common practice.
- Modification of RSMAS courses, as some were deactivated.

UNIVERSITY OF MIAMI
COLLEGE of ENGINEERING

Electrical and Computer Engineering Department
P.O. Box 248294
Coral Gables, FL 33124

Ph: 305-284-3291
Fax: 305-284-4044
ece.dept.um@miami.edu
www.miami.edu/ece

Date: August 5, 2021

To: Dr. Linda Neider, Chair

Faculty Senate

From: Dr. Mohamed Abdel-Mottaleb

Chair, Department of Electrical and Computer Engineering

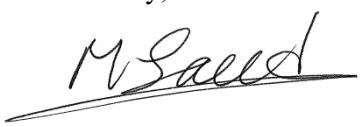
Subject: Letter of Support for the Proposal from the M.S. in Data Science

I am writing to express my support for the proposed changes to the M.S. in Data Science, including the addition of tracks in Marketing and Educational Measurement and Statistics.

I am also supportive of the corrections and additions of course numbers and course titles, as outlined by my colleagues from the College of Arts & Sciences, and of the addition of the CSC 712 internship copurse. I also support the removal of the GRE, which is in line with the policies of the Graduate School.

We look forward to continuing our strategic partnership with this interdisciplinary degree program.

Sincerely,



Mohamed Abdel-Mottaleb, Ph.D.

Date: August 5, 2021

To: Dr. Linda Neider, Chair
Faculty Senate

From: Dr. Brian Mapes
Graduate Program Director

Subject: Letter of Support for the Proposal from the M.S. in Data Science

I am writing to express my support for the proposed changes to the M.S. in Data Science, including the addition of tracks in Marketing and Educational Measurement & Statistics.

I am also supportive of the corrections and additions of course numbers and course titles, as outlined by my colleagues from the College of Arts & Sciences, and of the addition of the CSC 712 internship course. I also support the removal of the GRE, which is in line with the policies of the Graduate School. Lastly, I approve of the modifications to the RSMAS track as the OCE courses are deactivated and have been replaced with the appropriate MPO and ATM courses.

We look forward to continuing our strategic partnership with this interdisciplinary degree program.

Sincerely,

Brian Mapes

Brian Mapes, Ph.D.

UNIVERSITY OF MIAMI
SCHOOL of ARCHITECTURE

Office of the Dean
P.O Box 249178
Coral Gables, Fl 33124

Phone: 305-284-5000
Fax: 305-284-5245
www.arc.miami.edu

Date: August 5, 2021

To: Dr. Linda Neider, Chair
Faculty Senate

From: Dean Rodolphe el-Khoury
School of Architecture

Subject: Letter of Support - Proposal for the M.S. in Data Science

I am writing to express my support for the proposed changes to the M.S. in Data Science, including the addition of tracks in Marketing and Educational Measurement & Statistics.

I am also supportive of the corrections and additions of course numbers and course titles, as outlined by my colleagues from the College of Arts & Sciences, and of the addition of the CSC 712 internship course. I also support the removal of the GRE, which is in line with the policies of the Graduate School. Lastly, I approve of the removal of 500-level Architecture courses from the existing track in Smart Cities.

We look forward to continuing our strategic partnership with this interdisciplinary degree program.

Sincerely,

Rodolphe el-Khoury, Ph.D
Dean and Professor