

Program Change Request

Date Submitted: 01/18/21 7:20 pm

Viewing: **CC-CS-PHD : PHD. in Computer Science**

Last approved: 12/21/20 9:33 pm

Last edit: 01/18/21 7:20 pm

Changes proposed by: Reza Curtmola (crix)

In Workflow

1. **CS Chair**
2. **AIS**
3. **CC Dean**
4. **Vice Provost of Graduate Studies**
5. President of the Faculty Senate
6. Provost's Office
7. Academic Issues Committee

Approval Path

1. 01/18/21 7:27 pm
Baruch Schieber (sbar): Approved for CS Chair
2. 01/19/21 9:23 am
Mesfin Ayne (ayne): Approved for AIS
3. 01/19/21 9:28 am
Ali Mili (mili): Approved for CC Dean

History

1. Feb 23, 2020 by
Mesfin Ayne (ayne)

Ph.D. in Computer Science

Catalog Pages Using
this Program

Department(s) /
College(s)

Department

College

Computer Science (CS)

Ying Wu Coll of Computing (CC)

Name of Program PHD. in Computer Science

Academic Level(s) Doctoral

Degree Designation PHD

Campus(es) where
the program will be
offered Newark

CIP Code

Effective Catalog
Edition 2021-2022

Faculty Senate
Review required?

Related
Department(s)

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with other institutions, if any

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

Relationship to Similar Programs in the State and Region

List similar programs within the state and in neighboring states. How does this program compare to those currently being offered?

Distinguished Programs Nationally

For doctoral programs: Supply a select list of distinguished programs nationally in this discipline.

Students

Estimate anticipated enrollments from the program's inception until a steady state or optimum enrollment is reached.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program's first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

Course

Development Plan

Names of faculty

involved

Libraries and

Computing

Facilities

Classrooms and

Laboratories Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Curriculum

Course Requirements

For students entering the program with a Master's degree in Computer Science or related areas, 12-24 credits at the 600 and 700 level (at least 12 credits at the 700 level). The default requirement is 24 credits, but waivers for 600 level courses may be determined in consultation with and written approval by the PhD committee based on the student's prior background in the four areas of the qualifying examinations. At most 6 credits can be Independent Study in Computer

Science (CS 725 and/or CS 726). If a student takes two Independent Study courses, then they should be done with two different professors. At least 6 credits must be for lecture-based courses at the 700 level.

For students entering the program without a Master's degree in Computer Science or related areas, 36 credits at the 600 and 700 level. At least 12 credits must be at the 700 level, and out of those at most 6 credits can be Independent Study in Computer Science (CS 725 and/or CS 726). If a student takes two Independent Studies, then they should be done with two different professors. At least 6 credits must be for lecture-based courses at the 700 level.

Doctoral Dissertation Credits

For students who were admitted in the program in the Fall 2015 semester or after, the rules are described

at: <http://www5.njit.edu/graduatestudies/content/new-phd-credit-requirements/>

For students who were admitted in the program before the Fall 2015 semester, students must complete 30 credits of CS 790. A maximum of 6 credits of CS 792

Pre-Doctoral Research may be used toward the CS 790 requirement.

CS 791: Doctoral Seminar

Full-time students are required to enroll in CS 791 every semester. *Full-time PhD students are required to attend 2/3 of the weekly Wednesday departmental seminars.*

Qualifying Examinations

All PhD students are required to take qualifying examinations in three areas.

One examinations is in the combined area of:

CS 610	Data Structures and Algorithms
CS 611	Introduction to Computability and Complexity

Two examinations are in the following areas:

CS 630	Operating System Design	
CS 631	Data Management System Design	
CS 634	Data Mining	
CS-650	Computer Architecture	3
CS 656	Internet and Higher-Layer Protocols	
CS 659	Image Processing and Analysis	
CS-661	Systems Simulation	3
CS 670	Artificial Intelligence	
CS 675	Machine Learning	
BNFO-601	Foundations of Bioinformatics I	3

PhD students are allowed to take up to four qualifying examinations and are required to pass at least three out of the four (the combined CS 610 and CS 611 examination must be among the three examinations the students pass). If they fall short of the three examinations in the first year, then they must make up the number of missing examinations the second year and may take one more examination than the number they are required to pass.

Is licensure required of program graduates to gain employment?

No

Will the institution seek accreditation for this program?

No

Add any additional information you would like brought to the attention of CUE/ CGE here

Removed 3 Qual Exam areas for which courses are not offered on a regular basis.

Attach any additional information you would like brought to the attention of CUE/ CGE here: Uploaded Files:

Reviewer

Comments

Program Change Request

Date Submitted: 01/30/21 10:10 pm

Viewing: **AD-USYS-PHD : PHD. in Urban Systems**

Last approved: 08/19/20 2:54 pm

Last edit: 01/30/21 10:10 pm

Changes proposed by: Hyojin Kim (hjkim)

Catalog Pages [Ph.D. in Urban Systems](#)
Using this
Program

Department(s) /
College(s)

Department	College
Architecture (ARCH)	Hillier Coll of Arch & Design (AD)

Name of Program PHD. in Urban Systems

Academic Level(s) Doctoral

Degree Designation PHD

Campus(es) where the Newark

In Workflow

1. ARCH Chair
2. AIS
3. AD Dean
4. Vice Provost of Graduate Studies
5. President of the Faculty Senate
6. Provost's Office
7. Academic Issues Committee

Approval Path

1. 12/09/20 10:59 pm
Gernot Riether (griether):
Approved for ARCH Chair
2. 12/10/20 8:10 am
Mesfin Ayne (ayne): Approved for AIS
3. 12/11/20 1:46 pm
John Cays (cays):

program will be offered

CIP Code

Effective Catalog Edition 2020-2021

Faculty Senate Review required?

Related Department(s)

Approved for AD Dean

4. 01/30/21 7:22 pm

Jessie Tsui (tsui): Rollback to Initiator

5. 01/31/21 2:19 pm

Gernot Riether (griether): Approved for ARCH Chair

6. 01/31/21 5:17 pm

Mesfin Ayne (ayne): Approved for AIS

7. 01/31/21 6:09 pm

John Cays (cays): Approved for AD Dean

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with other institutions, if any

Objectives

History

1. Aug 19, 2020 by Jessie Tsui (tsui)

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

Relationship to Similar Programs in the State and Region

List similar programs within the state and in neighboring states. How does this program compare to those currently being offered?

Distinguished Programs Nationally

For doctoral programs: Supply a select list of distinguished programs nationally in this discipline.

Students

Estimate anticipated enrollments from the program's inception until a steady state or optimum enrollment is reached.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program's first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

Course

Development

Plan

Names of faculty

involved

Libraries and

Computing

Facilities

Classrooms and

Laboratories

Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Ph.D. in Urban Systems

~~The Ph.D. The Joint PhD Program in Urban Systems offers students opportunities to examine the complex relationships between physical, cultural, ecological, political, social, and economic aspects of cities in the U.S. and other countries, and to specialize in those topics of particular interest to them. Program With the exception of students pursuing a specialization in Urban Systems History, the research approach in the program is jointly offered by New Jersey's two senior public research institutions: based in the social sciences. Two senior public research universities in Newark co-sponsor the program: New Jersey Institute of Technology (NJIT) and Rutgers, The State University of New Jersey at Newark (RU-N). Rutgers University Newark. All students in the program have full access to library, computing, and other student services at both campuses. The program gives students the tools to develop research-based knowledge in urban systems, to take an analytic view toward urban problems and to participate in the development and evaluation of policy and services for urban populations. The program consists of three tracks: two tracks and one sub-specialization: Technology at NJIT, (1) Urban Environment with and a possible sub-specialization in Urban History in the School of Architecture at NJIT and (2) Global Urban Studies in the School of Arts and Sciences at NJIT, and Global Urban Studies at RU-N. Rutgers Newark. Students admitted to~~

~~who are interested in the technology track or the Urban Environment track must fulfill the requirements as specified in this catalog. Track (including a specialization in Urban History) apply to NJIT (<http://www.njit.edu/admissions/how-apply-graduate-admissions>).~~

Program Milestones

Each university follows its own timeline for candidacy and final defense. This includes:

~~The following items are required coursework for application to the Ph.D. Urban Environment Track at NJIT: program and Those interested in Global Urban Studies apply to Rutgers Newark (<https://sasn.rutgers.edu/academics-admissions/graduate-programs/global-urban-studies-gus>).~~ Acceptance into the (major part program is decided jointly by coordinators of the) qualifying exam must be completed successfully by the end of the second year in the program. **two tracks.**

~~The dissertation proposal must be defended successfully either by the end of the third year in the Ph.D. All students in the program complete a 51-credit curriculum. Urban Environment Track Students in this track come to the program with previous degrees in architecture, landscape architecture, urban planning, political science and economics. Once in the program, they focus on the physical and spatial aspects of cities and larger metropolitan areas, taking a contemporary perspective, a historical perspective or a combination of both. They choose dissertation topics in architecture, landscape architecture, urban design, infrastructure, urban development, and urban agriculture, and pursue those topics in relation to social, cultural, ecological, and regulatory issues.~~ **program or four semesters after registering for** ~~Those who choose a sub-specialization in Urban History take courses in research methods related to that while other students in the~~ **first time in track take research methods courses in the 792 pre-doctoral research course, whichever occurs earlier. social sciences.**

The dissertation must be defended successfully by the end of the sixth year in the Ph.D. program.

RCR Requirement

In their first year in the program, Ph.D. students must register ~~Once~~ in the 0-credit online course INTD 799 Responsible Conduct of Research (RCR) and receive ~~cities and larger metropolitan areas, taking a satisfactory grade. contemporary perspective, a historical perspective or a combination of both.~~

Selection of Dissertation Advisor

Temporary advisors are assigned upon entry into the program. Students must select a dissertation topic ~~All students in the program have full access to library, computing, and permanent advisor by the fourth semester in the program other student services at the latest. both campuses.~~ Change of advisor requires ~~interview (optional, at the consent of the previous advisor and departmental approval. discretion of track director)~~ In cases where more than one advisor is directing the dissertation, the primary advisor must be on the core departmental faculty.

Qualifying Examination

Students are required to take the Qualifying Exam (QE) at the end of their second year upon completion of all core courses.

Should they fail the exam, they may take it once more in the fall semester of their third year. Should they fail the exam for the second time, they are dismissed from the program.

Dissertation Committee

A dissertation committee must be formed and approved within one year of passage of the QE but no later than the end of the fifth semester. The committee consists of a minimum of five members, one of whom is external to the Ph.D. program or to NJIT or Rutgers. ~~For information about Global Urban Studies at Rutgers Newark, please see <https://sasn.rutgers.edu/academics-admissions/graduate-programs/global-urban-studies-gus>.~~ Admission to the Program The majority of the committee members are NJIT/Rutgers Graduate Faculty from the student's ~~Criteria for admission to the~~ program or department having ~~include a record of academic achievement, previous~~ research ~~experience or developing~~ experience, and a clear expression of research interests ~~related to the dissertation research. that are compatible with faculty expertise in the two universities. A completed master's degree is normally required of all applicants.~~ The dissertation committee chairperson typically is the doctoral candidate's dissertation advisor. This chairperson must be a tenured or tenure-track faculty member in the program. Two committee members, including an external member, may serve as co-advisors. The advisor, or at least one of the co-advisors, ~~Those applying directly from a Bachelor's degree program~~ must be a tenured or tenure-track faculty member from the program. ~~have a cumulative undergraduate GPA of 3.75 or higher.~~ The other members of the dissertation committee, except for an external member from outside the university, must be members of NJIT/Rutgers Graduate Faculty. Former students of any committee member, who are less than four years beyond doctoral completion, are specifically excluded from membership. The external members should either have appropriate faculty rank elsewhere or have sufficient research expertise.

Dissertation Proposal

Doctoral students must prepare a written research proposal and make an oral presentation for approval by their dissertation committee. The purpose of ~~program gives students~~ the dissertation proposal is ~~tools~~ to present a complete ~~develop research-based knowledge in urban systems, to take an analytic view toward urban problems~~ and well-developed outline of ~~to participate in the~~ research planned ~~development and evaluation of policy and services~~ for the dissertation. ~~urban populations.~~ The dissertation should present original research on a topic related to Urban Systems, which will be organized with a cohesive research theme/topic outlining the following: research problem, theoretical or conceptual framework, literature review, and methods. Students would work closely with their dissertation advisor to determine the final format for the proposal.

Dissertation Defense

The dissertation must be defended in a publicly announced oral defense. The dissertation defense is scheduled after the dissertation has been completed and approved by the student's Dissertation Committee. All members of the committee must be present to hear the defense. A successful defense of the dissertation is determined by vote of the dissertation committee. The Office of Graduate Studies policies on deadlines and submission of dissertation ~~other countries,~~ and abstracts are also to be

followed. specialize in those topics of particular interest to them. Every member of the dissertation committee must sign the approval page of the final dissertation document.

~~Students who are interested in the Urban Environment Track (including a specialization in Urban History) apply to NJIT (http://www.njit.edu/admissions/how_apply_graduate_admissions). Those interested in Global Urban Studies apply to Rutgers Newark (https://sasn.rutgers.edu/academics_admissions/graduate_programs/global_urban_studies_gus). Acceptance into the program is decided jointly by coordinators of the two tracks. The following items are required for application to the Urban Environment Track at NJIT: Scores from the Graduate Record Examination (GRE) Scores from Test of English as a Foreign Language (TOEFL) for international students Official transcripts of all prior academic work Three letters of recommendation (faculty preferred) Written statement of purpose, including description of research interests Interview (optional, at the discretion of track director) More Information For questions regarding the Urban Environment Track at NJIT please contact: Fred Little, Graduate Program & Admissions Coordinator, School of Architecture, little@njit.edu 973.642.7576 Karen A. Franck, Professor, Coordinator of Urban Environment Track, School of Architecture, franck@njit.edu 347-229-2418. For questions regarding the Global Urban Studies track at Rutgers Newark, please contact the track coordinators: Jamie Lew, Associate Professor, Department of Sociology and Anthropology, jamieLew@rutgers.edu 973-353-5130 Mara Sydney, Associate Professor, Department of Political Science, 973-353-5787 msidney@rutgers.edu~~

Curriculum

Degree Requirements

To graduate, The curriculum for all Urban Systems students in the Technology track or the Environment track must have an approved dissertation consists of a 9-credit core curriculum, a 12-credit research core, 18-credits of elective courses and complete a total of 51 credits, which consists of a 14-credit core curriculum, a 21-credit elective component, and a 16-credit dissertation research. 12-credit dissertation sequence. Students need to get departmental approval for the courses they take for their degree requirements. In rare circumstances, highly-qualified students without a master's degree may be admitted and asked to take additional courses.

Core

14

Qualitative methods (3 Credits) 1

Quantitative methods (3 Credits) 1

Additional research methods or theory course (3 Credits)

Additional research methods or theory course (3 Credits)

Colloquium (2 Credits) 2

Electives 3

21

Dissertation Research 4

16

USYS 792**Dissertation Research (6 Credits)****USYS 790****Dissertation Research (10 Credits)**

Total Credits

51

1Students pursuing a sub-specialization in Urban History within the Environment Track take research methods in architectural and urban history in place of the two core methods courses (i.e., qualitative methods and quantitative methods). Which courses would fulfill this requirement would be determined by the student's dissertation advisor.

2Ph.D. Students must register two semesters for 1 credit of colloquium (i.e., total 2 credits).

3Electives are chosen in consultation with the program director and, eventually, the student's dissertation advisor. No more than 6 credits may be USYS 725 Independent Study I or USYS 726 Independent Study II.

4Ph.D. students must register for 3 credits of pre-doctoral research (USYS 792) until they defend successfully the dissertation proposal.

~~Following completion of the core curriculum and the two required research courses, all students in the program must take and pass the qualifying examination in order to advance to doctoral candidacy and dissertation. Admission to the Urban Systems PhD Program is not a guarantee of success on the qualifying examination, or a guarantee of advancement to doctoral candidacy.~~

~~PhD Faculty, NJIT~~
~~Maurie Cohen, Professor, Department of Humanities, PhD, University of Pennsylvania~~
~~Zeynep Celik, Distinguished Professor, School of Architecture, PhD, University of California Berkeley~~
~~Gabrielle Esperdy, Associate Professor, School of Architecture, PhD, City University of New York~~
~~Karen A. Franck, Professor, School of Architecture, PhD, City University of New York~~
~~Neil Maher, Professor, Federated Department of History, PhD, New York University~~
~~Stephen Pemberton, Professor, Federated Department of History, PhD, University of North Carolina at Chapel Hill~~
~~Anthony Schuman, Professor, School of Architecture, M.Arch, Columbia University~~
~~Darius Solloway, Associate Professor, School of Architecture, M.Arch, Columbia University~~
~~Georgeen Theodore, Professor, School of Architecture, M.Arch, Harvard University~~
~~PhD Faculty, Rutgers Newark~~
~~Leyla Amzi-Erdogdu, Assistant Professor, Federated Department of History, PhD, Columbia University~~
~~Ariane Chebel d'Appollonia, Professor, School of Public Affairs and Administration, PhD, Institut d'Etudes Politiques de Paris~~
~~Jamie Lew, Associate Professor, Department of Sociology and Anthropology, PhD, Teachers College, Columbia University~~
~~Sean T. Mitchell, Associate Professor, Department of Anthropology and Sociology, PhD, University of Chicago~~
~~Arthur Powell, Associate Professor, Department of Urban Education, PhD, Rutgers University, New Brunswick~~
~~Alan Sadovnik, Board of Governors Distinguished Service Professor, School of Public Affairs and Administration PhD, New York University~~
~~Mara Sydney, Associate Professor, Department of Political Science, PhD, University of Colorado~~
~~Nükhet Varlık, Associate Professor, Federated Department of History, PhD, University of Chicago~~

~~Core Curriculum Urban Systems Curriculum (all courses are three credits)~~
~~Semster University Core (9 credits) History of the Global Metropolis (Arch 662-102) OR The Good City (USYS 711) Fall NJIT~~
~~Globalization, International Migration and Contemporary Cities (RU-26:834:690) OR Urban Governance in Global Perspective (RU-26:977:624:02) Fall Rutgers~~
~~Urban Theory and the~~

~~Contemporary City (Arch 662-102) Spring NJIT/Rutgers The Good City: Environmental Design and the Quality of Urban Life (USYS 711) OR History of the Global Metropolis (Arch 662-101) Spring NJIT Urban Governance in Global Perspective (RU 26:977:624:02) OR Globalization, International Migration and Contemporary Cities (RU 26:834:690) Fall Rutgers Core (9 credits) Qualitative Methods (RU 26:977:620) Spring Rutgers Quantitative Methods (URB 6103) Fall RBHS Additional research methods course Additional research methods course Electives (18 credits) Chosen in consultation with academic advisor and, eventually, dissertation advisor Dissertation research (12 credits) Total credits (51)~~

Is licensure required of program graduates to gain employment?

No

Will the institution seek accreditation for this program?

No

Add any additional information you would like brought to the attention of CUE/ CGE here

The proposed curriculum change, as described in the attached memo, was approved by the Program Executive Board on December 11, 2020, and the HCAD faculty on January 27, 2021.

Attach any additional information you would like brought to the attention of CUE/ CGE here: Uploaded Files:

[USYS PhD Program Changes.pdf](#)

Reviewer Comments

Jessie Tsui (tsui) (01/30/21 7:22 pm): Rollback: Rolled back as requested.

Program Change Request

Date Submitted: 01/04/21 10:06 pm

Viewing: **SM-MBA-MBA : M.B.A. in Management of Technology**

Last approved: 12/21/20 9:38 pm

Last edit: 01/04/21 10:06 pm

Changes proposed by: Michael S Koskinen (michaelk)

In Workflow

1. **MGMT Chair**
2. **AIS**
3. **SM Dean**
4. **Vice Provost of Graduate Studies**
5. President of the Faculty Senate
6. Provost's Office
7. Academic Issues Committee

Approval Path

1. 12/22/20 10:37 am
Zhipeng Yan (zyan):
Approved for
MGMT Chair
2. 12/23/20 10:05 am
Jessie Tsui (tsui):
Rollback to Initiator
3. 01/04/21 7:33 pm
Melodi D. Guilbault
(guilbault): Rollback
to Initiator
4. 01/06/21 12:34 pm
Melodi D. Guilbault
(guilbault): Approved
for MGMT Chair

Catalog Pages Using
this Program

[M.B.A. in Management of Technology](#)

Department(s) / College(s)	Department	College
	Management (MGMT)	Martin Tuchman Sch of Mgmnt (SM)

Name of Program M.B.A. in Management of Technology

Academic Level(s) Graduate

Degree Designation MBA

Campus(es) where
the program will be
offered Newark
On-line (NJIT)

CIP Code

Effective Catalog
Edition 2021-2022

Faculty Senate
Review required?

Related
Department(s)

- 5. 01/11/21 3:42 pm
Mesfin Ayne (ayne):
Approved for AIS
- 6. 01/11/21 5:50 pm
Oya Tukel (tukel):
Approved for SM
Dean

History

1. Dec 21, 2020 by
Michael S Koskinen
(michaelk)

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with other institutions, if any

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

Relationship to Similar Programs in the State and Region

List similar programs within the state and in neighboring states. How does this program compare to those currently being offered?

Distinguished Programs Nationally

For doctoral programs: Supply a select list of distinguished programs nationally in this discipline.

Students

Estimate anticipated enrollments from the program’s inception until a steady state or optimum enrollment is reached.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program’s first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

- Course
- Development Plan
- Names of faculty involved
- Libraries and Computing Facilities
- Classrooms and Laboratories Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

- Curriculum
- Bridge Course

<u>MGMT 501</u>	Management Foundations	3
Total Credits		3
Module I 1		
<u>ACCT 615</u>	Management Accounting	3
<u>FIN 600</u>	Corporate Finance I	3
<u>FIN 610</u>	Global Macro Economics	3
or <u>ECON 610</u>	Managerial Economics	
<u>HRM 601</u>	Organizational Behavior	3
<u>MGMT 691</u>	Legal and Ethical Issues	3
<u>MIS 645</u>	Information Systems Principles	3
or <u>IS 677</u>	Information System Principles	
<u>MIS 680</u>	Management Science	3
or <u>MGMT 630</u>	Decision Analysis	
<u>MRKT 620</u>	Competing in Global Markets	3
<u>MGMT 692</u>	Strategic Management	3
or <u>MGMT 680</u>	Entrepreneurial Strategy	
Module II Elective Core Courses		
Select three of the following:		9
<u>MGMT 620</u>	Management of Technology	
<u>MGMT 635</u>	Data Mining and Analysis	
<u>MGMT 640</u>	New Venture Management	
<u>MGMT 650</u>	Knowledge Management	
<u>MGMT 670</u>	International Business	
<u>MGMT 699</u>	ST in Management	
<u>MIS 648</u>	Decision Support Systems for Managers	
<u>EM 636</u>	Project Management	
<u>HRM 630</u>	Managing Technological and Organizational Change	
Module III Concentration Courses		
Select four courses in one concentration:		12
MIS Concentration Courses 1		
<u>MGMT 630</u>	Decision Analysis	
<u>MGMT 650</u>	Knowledge Management	
<u>MGMT 635</u>	Data Mining and Analysis	
<u>MGMT 641</u>	Global Project Management	

MGMT 710	Forecasting Methods for Business Decisions
MIS 648	Decision Support Systems for Managers
<u>IS 601</u>	Web Systems Development
<u>IS 631</u>	Enterprise Database Management
<u>IS 663</u>	System Analysis and Design
<u>IS 665</u>	Data Analytics for Info System
<u>IS 678</u>	IT Service Management
<u>IS 684</u>	Business Process Innovation
<u>IS 688</u>	Web Mining

Finance Concentration Courses

FIN 610	Global Macro Economics
<u>FIN 611</u>	Intro to Topics in Fin Tech
<u>FIN 624</u>	Corporate Finance II
<u>FIN 626</u>	Financial Investment Institutions
<u>FIN 627</u>	International Finance
<u>FIN 634</u>	Mergers, Acquisitions, and Restructuring
<u>FIN 641</u>	Derivatives Markets
<u>FIN 642</u>	Derivatives and Structured Finance
<u>FIN 650</u>	Investment Analysis and Portfolio Theory

Marketing Concentration Courses

<u>MRKT 631</u>	Marketing Research
<u>MRKT 632</u>	Marketing Strategy for Technology-Based Organizations
<u>MRKT 636</u>	Design and Development of High Technology Products
<u>MRKT 645</u>	Internet Marketing Strategy
<u>MRKT 638</u>	Sales Management for Technical Professionals
<u>MNE 655</u>	Concurrent Engineering
<u>MGMT 625</u>	Distribution Logistics
<u>IE 659</u>	Supply Chain Engineering
<u>IS 664</u>	Customer Discovery
MGMT 635	Data Mining and Analysis
MIS 648	Decision Support Systems for Managers
CS 631	Data Management System Design
CS 632	Advanced Database System Design
CS 634	Data Mining

CS 639	Elec. Medical Records: Med Terminologies and Comp. Imp:
BNFO 615	Data Analysis in Bioinformatics
BNFO 644	Data Mining and Management in Bioinformatics
MATH 663	Introduction to Biostatistics
IE 686	Intro to Healthcare Systems
IE 687	Healthcare Enterprise Systems
IE 688	Healthcare Sys Perfor Modeling

Cooperative Education

Innovation and Entrepreneurship Concentration Courses 2

<u>MGMT 620</u>	Management of Technology
<u>MGMT 625</u>	Distribution Logistics
<u>MGMT 640</u>	New Venture Management
<u>MGMT 645</u>	New Venture Finance
<u>MGMT 649</u>	Convention, Creativity and Innovation
<u>MGMT 688</u>	Information Technology, Business and the Law
<u>MRKT 636</u>	Design and Development of High Technology Products
<u>HRM 630</u>	Managing Technological and Organizational Change

IT Sales & Analytics 3

MGMT 691	Legal and Ethical Issues
<u>MRKT 631</u>	Marketing Research
MRKT 655	Sales Process and Analytics
<u>MRKT 632</u>	Marketing Strategy for Technology-Based Organizations
<u>MRKT 645</u>	Internet Marketing Strategy
<u>IS 678</u>	IT Service Management
<u>MRKT 638</u>	Sales Management for Technical Professionals

Custom Concentration

Select 4 elective courses

STEM-MBA Option Concentration

Select 4 elective courses

Total Credits

48

1 All courses required. No substitutions.

2 **On-campus program only**

3 **MRKT 655 and IS 678 required**

Is licensure required of program graduates to gain employment?

Will the institution seek accreditation for this program?

Add any additional information you would like brought to the attention of CUE/ CGE here

Attach any additional information you would like brought to the attention of CUE/ CGE here: Uploaded Files:

Reviewer	Jessie Tsui (tsui) (12/23/20 10:05 am): Rollback: Rollbacked per request
Comments	Melodi D. Guilbault (guilbaul) (01/04/21 7:33 pm): Rollback: Updates are needed

Program Change Request

New Program Proposal

Date Submitted: 11/30/20 8:13 pm

Viewing: **EN-BME-PHD : Joint PhD Program in BME with Rutgers**

Biomedical and Health Sciences

Last edit: 12/03/20 7:58 am

Changes proposed by: Mesut Sahin (sahin)

In Workflow

1. BME Chair
2. AIS
3. EN Dean
4. Vice Provost of Graduate Studies
5. President of the Faculty Senate
6. Provost's Office
7. Academic Issues Committee

Approval Path

1. 12/02/20 9:45 am
Bryan Pfister (pfister): Approved for BME Chair
2. 12/03/20 7:59 am
Mesfin Ayne (ayne): Approved for AIS
3. 12/10/20 11:54 am
Kam Moshe (kam): Approved for EN Dean

Department(s) / College(s)	<table border="1"><thead><tr><th>Department</th><th>College</th></tr></thead><tbody><tr><td>Bio-Medical Engineering (BME)</td><td>Newark College of Engineering (EN)</td></tr></tbody></table>	Department	College	Bio-Medical Engineering (BME)	Newark College of Engineering (EN)
Department	College				
Bio-Medical Engineering (BME)	Newark College of Engineering (EN)				
Name of Program	Joint PhD Program in BME with Rutgers Biomedical and Health Sciences				
Academic Level(s)	Doctoral				
Degree Designation	PHD				
Campus(es) where the program will be offered	Newark				
CIP Code	EN-BME-PHD - EN-BME-PHD				
Effective Catalog Edition	2021-2022				
Faculty Senate Review required?					
Related Department(s)	<table border="1"><thead><tr><th>Department(s)</th></tr></thead><tbody></tbody></table>	Department(s)			
Department(s)					

Department(s)
Bio-Medical Engineering (BME)

List the institutions with which articulation agreements will be arranged:
Rutgers School of Graduate Studies Biomedical and Health Sciences

Articulation with other institutions, if any

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Our Doctor of Philosophy Degree in Biomedical Engineering is jointly offered by New Jersey Institute of Technology (hereinafter referred to as “NJIT”) and Rutgers, The State University of New Jersey, through its School of Graduate Studies, Biomedical and Health Sciences on the Newark Health Science Campus (hereinafter collectively referred to as “Rutgers SGS-BHS”). The partnering institutions (NJIT/BME department and Rutgers SGS-BHS) have developed a joint program in Biomedical Engineering leading to a Ph.D. degree (the “Joint Degree Program”). Graduates who will have this degree will be prepared for positions of leadership and management in the pertinent educational, research, and health care systems.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

Our training program combines the academic strengths of the Rutgers SGS-BHS with NJIT Biomedical Engineering (BME) and builds upon the collaboration that currently exists between faculty at both institutions. This joint Ph.D. program is truly integrative across the two Universities: from course work, to laboratory rotations, to collaborative projects and training. The physical proximity of the two institutions facilitates access to courses, laboratories, libraries, and seminars, as well as blends scientific and clinical opportunities in education and research. In addition, the location of NJIT and Rutgers SGS-BHS in Newark promotes interaction with New Jersey's pharmaceutical and medical device industries and medical facilities.

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

An advanced Degree in Biomedical Engineering is in line with NJITs vision for becoming a top research university in the state.

Relationship to Similar Programs in the State and Region

List similar programs within the state and in neighboring states. How does this program compare to those currently being offered?

A PhD Program in Biomedical Engineering exists at all major universities, including Stevens Institute of Technology and Rutgers-New Brunswick Campus. This Joint PhD program is unique as it is a Joint program with a local medical school campus in Newark. The faculty expertise and research areas are also uniquely vested in non-overlapping fields with other institutes in New Jersey.

Distinguished Programs Nationally

For doctoral programs: Supply a select list of distinguished programs nationally in this discipline.

PhD in Biomedical Engineering exists in all prestigious universities in the USA.

Students

Estimate anticipated enrollments from the program's inception until a steady state or optimum enrollment is reached.

This is a renewal of our current contract with Rutgers SGS-BHS. Under the current program there is more than forty PhD students and the program size expected to grow with new faculty being hired by both partnering institutes.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program's first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

None

Course Development Plan All courses needed for this program are currently in place.

Names of faculty involved

All Tenure-Tract/ Tenured faculty in the Biomedical Engineering Department at NJIT and the faculty at Rutgers SGS-BHS.

Libraries and Computing Facilities No new resources required.

Classrooms and Laboratories Needs

No new classrooms are required.

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Students may enter this joint Ph.D. degree program (“Joint Degree Program”) from varied backgrounds. The Joint Degree Program acknowledges this characteristic of the target student audience, and adopts the following requirements in course credits depending on each student’s background at entry:

- (1) Students entering the Joint Degree Program after they have earned an M.S. degree in Biomedical Engineering are required to complete at least 24 semester credits in graduate-level courses.
- (2) Students who have earned an M.D., D.M.D., D.V.M., or other medical/clinical doctorate, and students entering with an M.S. degree not in Biomedical Engineering may be required to complete up to an additional 12 graduate level course credits (for a total of up to 36 course credits), based on individual considerations as determined by the Steering Committee Co-Directors and in consultation with the student’s thesis advisor.
- (3) Students may also be admitted directly to the Joint Degree Program after earning a B.S. degree. In this case, they will be required to complete additional 12 graduate-level course credits compared to students entering the program with an M.S. degree (for a total of up to 36 course-credits).
- (4) In all cases, the total of all graduate-level coursework must be completed with a cumulative GPA of 3.0 or higher.
- (5) There is no stipulated minimum requirement for dissertation research credits. The student, however, will follow the requirements for registration for dissertation research credits as it pertains to his/her primary institution.

Every student must attempt and pass a qualifying examination. The format and requirements for this exam will be updated from time to time by the Joint Degree Program’s Steering Committee subject to approvals by the partnering institutions through their normal processes. Currently, the qualifying exam consists of 2 parts: (1) a written research proposal in the NIH proposal format, and (2) an oral defense of the written proposal and accessory topics.

- (1) Students who have earned a M.S. degree can take the qualifying examination at the end of their first year in the Joint Degree Program. They must take the exam by the end of their second year in the Joint Degree Program. There is no minimum for the number of credits that a student must complete prior to taking the exam.
- (2) Students who have earned a baccalaureate degree (but not a graduate degree) will take the qualifying examination at the end of their second year in the Joint Degree Program.
- (3) Students may take the qualifying examination prior to taking IBMS (if deferred) with permission from the Joint Degree Program’s Steering Committee Co-Directors.

Directed research. The research will be supervised jointly by Rutgers SGS-BHS and NJIT graduate faculty, in accordance with the requirements established for the joint Ph.D. degree. The research must culminate in the successful preparation of a written dissertation of publishable quality, which must be defended orally at a public meeting. The Dissertation Examination Committee will be formed according to the policies of the student's primary institution, but must include at least one faculty member from Rutgers SGS-BHS, one faculty member from NJIT, and one of whom is external to the Ph.D. program. The requirements for presentations and forums (e.g., presentation of dissertation proposal, dissertation defense) will be administered according to the regulations of the student’s primary institution. The protection of the dissertation content and the publication, utilization and protection of the involved research activities will be subject to the regulations of the primary institution. If required, specific agreements will be arranged for the allocation and protection of intellectual property.

Curriculum

A student's program of graduate coursework must fulfill published requirements that will be updated from time to time by the Joint Degree Program's Steering Committee, subject to approvals by the partnering institutions through their normal processes. According to the current agreement:

(1) Students entering the program with an M.S. degree in Biomedical Engineering are required to take a minimum of 24 semester credits of graduate level courses.

- At least 9 credits of biomedical engineering coursework shall be selected in the field of specialization chosen by the student.
- At least 9 credits of biomedical sciences to include:
- Foundation coursework appropriate to the field of specialization

a) Introduction to Biomedical Science (IBMS, GSND5200Q) for 5 credits. This is the default required course.

b) If appropriate, the student's advisor may petition the steering committee to replace this course with one of the following:

i) Fundamentals of Neuroscience (NEUR5200Q) and Foundations of Integrative Human Physiology (CBNP 5165Q) for 5 credits

ii) Fundamentals of Neuroscience (NEUR5200Q) and Fundamentals of Human Physiology (PHPY5005Q) for 6 credits

- Professional Skills II, Grantsmanship Skills (GSND5006Q) for 2 credits
- Research Design and Statistics (GSND5135Q) for 2 credits
- The remaining 6 credits can be any relevant science or engineering course depending on area of research focus.

(2) All students must have had one (1) course on responsible conduct of research. The course can be GSND5001Q or an equivalent. This course can count towards the "remaining 6 credits" in section 1.

(3) Each student must undergo at least 2 laboratory rotation experiences, at least one at each one of the partnering institutions.

(4) Registration and satisfactory attendance at seminars as required by the primary institution.

(5) In specific cases, students with an engineering background may need preliminary study prior to taking the IBMS course. The IBMS course may be deferred to the second year of the program with approval of the Steering Committee Co-Directors.

(6) Among the graduate courses, at least 12 semester credits must be at the advanced graduate level (as determined by the Steering Committee Co-Directors, after consultation with the graduate faculty at both partnering institutions).

(7) Students entering with a B.S will be required to take 12 additional graduate level course credits, with a minimum of 6 course credits from NJIT and the additional 6 from either campus depending on the student's research focus and in consultation with the members of the Dissertation Committee.

Is licensure required of program graduates to gain employment?

No

Will the institution seek accreditation for this program?

Yes

List the accrediting organization: Middle States Commission on Higher Education (MSCHE)

Add any additional information you would like brought to the attention of CUE/ CGE here The MOU with our partnering institute, signed by NJIT officials, is attached.

Attach any additional information you would like brought to the attention of CUE/ CGE here: Uploaded Files: [MOU Draft - Joint PhD Degree - Biomedical Engineering Program version 012 signed FPD.pdf](#)

Reviewer
Comments

CGE-approved item

- **Change in the language of the course repetition policy**

“A maximum of two course *repetitions are allowed* in matriculated graduate study. The grade received in a repeated course is calculated in the cumulative GPA, but the first grade still appears on the transcript. Students may not repeat a course without prior approval from the department. Non-matriculated students, including certificate students, may repeat a maximum of one course. Students who receive an F in a course will be required to repeat that course.

The academic advisor may contact the Vice Provost for Graduate Studies if the course is no longer offered or not applicable to the student's current program, or other extenuating circumstances are believed to exist.”