TO: Barbara D'Ambrosia, Chair, Faculty Council (FC)
FROM: Committee on Academic Policies (CAP)
RE: CAP Report on the Proposal for a Major and Minor in Data Science
DATE: November 22, 2016
CC: Margaret Farrar, Dean, College of Arts and Sciences (CAS)
Graciela Lacueva, Associate Dean for Sciences, Mathematics, and Health
Jeanne Colleran, Provost and Academic Vice President
Dennis F. Hareza, Chief Financial Officer
David Wong, Executive Director of Academic Finance
Brian Williams, Vice President for Enrollment & Institutional Analytics
Paul Schick, Chair, Department of Mathematics and Computer Science
Todd Bruce, Director, Academic Assessment
Phyllis "Penny" Braudy Harris, Department of Sociology & Criminology
Rebecca Drenovsky, Department of Biology
Jeffrey Dyck, Department of Physics
Margaret Finucane, Tim Russert Department of Communication & Theatre Arts
Kathleen Manning, Program in Exercise Science, Physical Education, and Sports Studies
Mindy Peden, Department of Political Science
Debby Rosenthal, Department of English
Jackie Schmidt, Entrepreneurship Program
Sheri Young, Department of Psychology

 Charge from FC: FC forwarded the Proposal for a Major and Minor in Data Science (the Proposal) written by Dr. Linda Seiter of Mathematics and Computer Science Department to CAP, a subcommittee of FC. Furthermore, FC recommended that CAP work with appropriate administrative contact person from CAS, Dr. Graciela Lacueva.

 Procedure that CAP followed: CAP used the 'Protocol for Requesting Approval of a New Academic Program' (Protocol), revised on November 22, 2013 as a guideline to review this proposal. As a result, CAP reviewed all the following documents:

1. the Proposal
2. Letters from
   a. the University Budget Committee (Dennis F. Hareza)
   b. the Executive Director for Academic Finance (David Wong)
   c. Enrollment Division (Brian Williams)
3. Letters of Support from
   a. CAS Dean and Associate Deans' joint letter
   b. Paul Shick
   c. Phyllis "Penny" Braudy Harris, Department of Sociology & Criminology
   d. Rebecca Drenovsky, Department of Biology
   e. Jeffrey Dyck, Department of Physics
   f. Margaret Finucane, Tim Russert Department of Communication & Theatre Arts
   g. Kathleen Manning, Program in Exercise Science, Physical Education, and Sports Studies
   h. Mindy Peden, Department of Political Science
   i. Debby Rosenthal, Department of English
   j. Sheri Young, Department of Psychology

4. Director of Academic Assessment (Todd Bruce)

More specifically, CAP had first round discussion about the Proposal on 9/22/16; provided written feedback (Appendix 1) to Dr. Seiter; had second round discussion on the Proposal on 10/18/16. During this process, CAS Dean and Associate Dean Dr. Lacueva were informed of our findings. Dr. Lacueva was invited to and joined our discussions both times. CAP had one-hour open hearings for the Proposal in on 10/26/16 and 10/27/16, respectively. Meanwhile, FC organized an online forum on Canvas running until 10/28/16. No one came to the open hearing and no questions were asked online or via email.

CAP highlights a few strengths here.

First, offering an undergraduate major and minor in Data Science is very timely due to the large disparity between the great need of entry level data analysts and the shortage of undergraduate data-science-type of majors offered in the US and around the world. If we start offering them and attract sufficient number of students within the next few years, we may position ourselves as a solid and early player in this field.

Second, the department is now poised to offer an undergraduate major and minor in Data Science for the following reasons: they hired 2 tenure-track professors specialized in data science (Drs Elena Manilich and Billie Marget) in 2015; 4 new courses need to be created for this major, however, in addition to Drs Elena Manilich and Billie Marget, other faculty members such as Drs Linda Seiter, Brendan Foreman, Marc Kirschenbaum and Dan Palmer are also interested and capable of teaching the 100 and 200 level new courses; the department terminated one major (CIS) last year. Note that a new major may draw an enrollment listed in the proposal or it may not for a few years. Therefore, it is likely to require some budget to implement it at least in the beginning. As Paul Shick indicated in the Letter of Support, the department will cover the operational cost of the Data Science Major and Minor for the first few years.

Third, the proposed Data Science major requires 12 credits of Domain Knowledge from one area of specialization which includes both natural and social sciences and humanities. This is built upon our strength in liberal arts education and calls for multi-disciplinary collaborations across campus. Hence, the major in Data Science at JCU distinguishes itself from many Data Science majors connecting mainly with business or engineering.

Finally, the subject of Data Science is very new. This is both opportunity and challenge in recruiting. There is a clear demand of entry level data analysts in Cleveland area, the US, and around the world. However, this may not translate into a large enrollment in the Data Science major. As high school teachers and students may not be aware of this new major in general and at JCU in particular, education of high school teachers/students and advertisement/outreach to high schools can be critical. The department proposes to offer one online course on Data Science to high school instructors. This can be an effective recruiting tool.

Major concerns that CAP had, documented in Appendix 1: Feedback from CAP, and those listed in the Joint letter from the Dean and Associate Dean, were well addressed in the revised proposal. CAP has two further recommendations.

The subject of Data Science is very new as discussed above. In addition to offering one online course on data science to high school instructors, we recommend the department to continue exploring other recruiting, marketing, and outreach activities to promote this new major. This part is not explicitly required by the 'Protocol', but may help attracting more majors to the department and/or new students to JCU.

The Letter of Support from Program in Exercise Science, Physical Education, and Sports Studies only discussed the support from the Chair. The Mathematics and Computer Sciences Department

should ensure that a Data Science Major with Domain Knowledge from Exercise Science, Physical Education, and Sport Studies can be well implemented should a student choose this path.

In summary, the Proposal addresses a need in offering a Major and Minor in Data Science. The major concerns that CAP had initially were well addressed in the revised proposal. The department also has the resources to implement the major and minor. We believe that the Proposal is ready to go out for a vote of the Faculty, if FC wishes to do so.

Appendix 1: Feedback from CAP

September 27th, 2016

Dear Dr. Seiter,

Thank you for submitting the Proposal for a Major and Minor in Data Science! CAP commends you and colleagues in MT/CS for investing considerate amount of time and effort in collaborating with many departments and for preparing a high quality proposal. CAP had our first discussion over this proposal on 9/22/16 based on the following documents:

1)   the proposal dated 9/13/2016
2)   Letter from the Executive Director for Academic Finance (David Wong)
3)   Letter from Enrollment (Brian Williams)
4)   Letter of Support from
         a) Joint letter from CAS Dean (Margaret Farrar) and Associate Dean (Graciela Lacueva)
         b) MT/CS Chair (Paul Shick)
         c) SC Chair (Penny Harris)
         d) Dept of Communication and theatre arts chair (Margaret Finucane)
         e) Director of Assessment (Todd Bruce)

Here we provide our feedback and hope that it may help strengthening your proposal. After receiving your modified proposal and all supporting documents, CAP will host opening hearings and discuss your proposal again. Finally, CAP will send our report on your proposal to FC.

The joint letter from CAS Dean and Associate Dean listed strength and concerns. CAP recommends that these concerns be addressed.

Furthermore, CAP highlights a few strengths.

Firstly, the idea of offering an undergraduate major and minor in Data Science is very timely due to the large disparity between the great need of entry level data analysts and the shortage of undergraduate data science type of majors offered in the US and around the world. If we start offering this major/minor and can attract sufficient number of students within the next few years, we will likely position ourselves as a solid and early player in this field.

Secondly, MT/CS department is now poised to offer an undergraduate major and minor in Data Science for the following reasons: they hired 2 tenure-track professors specialized in data science (Drs Elena

Manilich and Billie Marget) in 2015; 4 new courses need to be created for this major, however, in addition to Drs Elena Manilich and Billie Marget, other faculty members such as Drs Linda Seiter, Brendan Foreman, Marc Kirschenbaum and Dan Palmer are also interested and capable of teaching the 100 and 200 level new courses; MT/CS department terminated one major (CIS) last year.

Thirdly, the proposed Data Science major requires 12 credits of Domain Knowledge from one area of specialization which includes both natural and social sciences and humanities?. This is built upon our strength in liberal arts education and calls for multi-disciplinary collaborations across campus. Hence, the major in Data Science at JCU distinguishes itself from many Data Science majors connecting with business or engineering.

CAP has some questions/concerns:
1.   The subject of Data Science is very new. This is both opportunity and challenge in recruiting. There is a clear demand of entry level data analysts in Cleveland area, the US, and around the world. However, this may not translate into a large enrollment in the Data Science major. As high school teachers and students may not be aware of this new major in general and at JCU in particular, education of high school teachers/students and advertisement/outreach to high schools can be critical. CAP commends on the initiative of MT/CS to offer 1 online course on data science to high school instructors. This could be an effective recruiting tool. In addition to this effort, are there any other recruiting, marketing, outreach activities being or that will be developed to promote this new major? Though not explicitly required in the proposal, this discussion can strengthen your proposal especially if you have consulted with Enrollment and/or Advancement/Marketing and already have plans to address this.
2.   Program Learning Goal 4: Domain knowledge and its description: the description emphasizes using techniques to solve real-world problem; the word 'domain knowledge' seems to emphasizes the knowledge on specific area of science. Is it a better way to describe them?
3.   Out of 46 credits required for Data Science major, only 4 courses on Statistics/Computer Science/Math/Data Science are 300-400 levels. Is there enough depth for the students? As a comparison, major in Math and computer science requires 7-8 courses.
4.   Out of 7 departments potentially offer 'domain knowledge', 2 chairs submitted supporting letters. Please provide the supporting letters from the other 5 department chairs.
5.   For DATA470: please provide details to the course such as who will advise the students, where they will get data, cost of data, etc. You can give examples.
6.   Only 2 courses for data science minor is at 200 level or beyond. Is there enough depth? Other CS minors requires 3-4 courses at or beyond 200 level.
7.   In MT/CS chair (Paul Shick) supporting letter, Paul mentioned that the department will cover marginal cost. In the budget, the yearly cost covered by MT/CS is projected to be $10k-$15k. Can you ask Paul to be specific about this?
8.   During the discussion of the budget, the possibility of charging students lab fee is raised. If this will be included in the modified proposal, please modify the budget accordingly.
9.   Letter from University Budget Committee (UBC) is missing. CAP understands that UBC will meet on 10/11/2016. Please have it submit the letter in a timely fashion.

CAP