

# 2013-2014 LONG SIGNATURE SHEET



**UNC CHARLOTTE**

**Proposal Number:** ITCS 8-23-13

**Proposal Title:** Establishment of a new course, ITCS 6190/8190 "Cloud Computing for Data Analysis"

**Originating Department:** Computer Science

**TYPE OF PROPOSAL:** UNDERGRADUATE \_\_\_\_\_ **GRADUATE** X **UNDERGRADUATE & GRADUATE** \_\_\_\_\_  
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
17 September 2013	17 September 2013	18 September 2013	Approved	<u>DEPARTMENT CHAIR</u>  [print name here:] William Ribarsky
18 September 2013	23 September 2013	25 September 2013	Approved	<u>COLLEGE CURRICULUM COMMITTEE CHAIR</u>  [print name here:] Srinivas Akella
25 September 2013	15 October 2013	15 OCTOBER 2013	Approved	<u>COLLEGE FACULTY CHAIR (if applicable)</u>  [print name here:] K. R. Subramanian
			Approved	<u>COLLEGE DEAN</u>  [print name here:] YI DENG
			Approved	<u>GENERAL EDUCATION</u> (if applicable; for General Education courses)  [print name here:]
			Approved	<u>UNDERGRADUATE COURSE &amp; CURRICULUM COMMITTEE CHAIR</u> (for undergraduate courses only)
10-17-13	11-5-13	8 NOV 2013	Approved	<u>GRADUATE COUNCIL CHAIR</u> (for graduate courses only)  ALAN R. FREITAG
				<u>FACULTY GOVERNANCE ASSISTANT</u> (Faculty Council approval on Consent Calendar)
				<u>FACULTY EXECUTIVE COMMITTEE</u> (if decision is appealed)



# UNC CHARLOTTE

## LONG FORM COURSE AND CURRICULUM PROPOSAL

---

\*To: Graduate Council Chair

From: Department of Computer Science

Date: August 23, 2013

Re: Establishment of a new course, ITCS 6190/8190 “Cloud Computing for Data Analysis”

---

The Long Form is used for major curriculum changes. Examples of major changes can include: creation of a new major, creation of a new minor, creation of a new area of concentration, or significant changes (more than 50%) to an existing program (Note: changing the name of an academic department does not automatically change the name(s) of the degree(s). The requests must be approved separately by the Board of Governors.)

Submission of this Long Form indicates review and assessment of the proposed curriculum changes at the department and collegiate level either separately or as part of ongoing assessment efforts.

**University of North Carolina at Charlotte**

**New Graduate Course Proposal from Department of Computer Science**

**TITLE. Establishment of a new course ITCS 6190/8190 “Cloud Computing for Data Analysis”**

**II. CONTENT OF PROPOSALS**

**A. PROPOSAL SUMMARY.**

**1. SUMMARY.**

The Computer Science Department proposes to add a new elective course to the graduate curriculum: ITCS 6190/8190, “Cloud Computing for Data Analysis”. This elective course is intended for MS and PhD students in Computer Science, and for students in the proposed Professional Science Masters in Data Science and Business Analytics.

**B. JUSTIFICATION.**

- 1.** Identify the need addressed by the proposal and explain how the proposed action meets the need.

The ITCS 6190/8190 course “Cloud Computing for Data Analysis” will address the need for computing professionals skilled in the use of current Big Data technologies. These include Hadoop and related technologies for distributed data processing. The proposed course will provide students with hands-on experience with both the technology and data analysis algorithm skills that are being increasingly sought by employers regionally and nationally.

- 2.** Discuss prerequisites/corequisites for course(s) including class-standing, admission to the major, GPA, or other factors that would affect a student’s ability to register.

The pre-requisite for this course is ITCS 6114, or permission of instructor. ITCS 6114: Algorithms and Data Structures is a required course for MS students in Computer Science.

- 3.** Demonstrate that course numbering is consistent with the level of academic advancement of students for whom it is intended.

The course number will be ITCS 6190/8190. This number positions the course as a graduate level course for MS and PhD students in the Computer Science department.

4. In general, how will this proposal improve the scope, quality and/or efficiency of programs and/or instruction?

This course will be a hands-on introduction to computing for big data applications. As such, this will be an important elective course for students in the Computer Science MS and PhD programs, and in the proposed Professional Science Masters in Data Science and Business Analytics program.

5. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

The course has been previously taught as a special topics graduate course ITCS 6010/8010-001 in Spring 2010 and Spring 2012. The course enrollments were 21 and 26 respectively.

- C. **IMPACT.** Changes to courses and curricula often have impacts both within the proposing department as well as campus-wide. What effect will this proposal have on existing courses and curricula, students, and other departments/units? Submit an Impact Statement that fully addresses how you have assessed potential impacts and what the impacts of this proposal might be. Consider the following:

1. What group(s) of students will be served by this proposal?

This elective course will initially serve MS and PhD students in the Computer Science department in the College of Computing and Informatics. It is anticipated that it will additionally serve students in the proposed Professional Science Masters in Data Science and Business Analytics.

2. What effect will this proposal have on existing courses and curricula?

- a. When and how often will added course(s) be taught?

This elective course will be taught in the Spring semester. It is anticipated that there will be sufficient demand for the course for it to be offered every year.

**b.** How will the content and/or frequency of offering of other courses be affected?

This elective course will complement existing graduate courses in the College of Computing and Informatics. The majority of the course content does not overlap with other data management courses in the college. There will not be significant impact on the frequency of other offerings and enrollment in other courses.

**c.** What is the anticipated enrollment in course(s) added (for credit and auditors)?

The anticipated enrollment in the course is 30 students per year, with about 25 coming from the MS and PhD programs in CCI and about 5 coming from the proposed PSM in Data Science and Business Analytics.

**d.** How will enrollment in other courses be affected? How did you determine this?

We expect minimal impact of the ITCS 6190/8190 class on the enrollment of other classes. Since the only prerequisite is a required course for MS and PhD students in Computer Science (ITCS 6114 Algorithms and Data Structures), these students will not increase the enrollment in the ITCS 6114 course. Students from the DSBA PSM program will be a minority of the students in the ITCS 6190/8190 course and current course offerings of ITCS 6114 should be able to absorb the additional demand.

**e.** Identify other areas of catalog copy that would be affected, including within other departments and colleges (e.g., curriculum outlines, requirements for the degree, prerequisites, articulation agreements, etc.)

The proposed courses should be added as elective options. The proposed ITCS 6190/8190 course will be added to the Data Management concentration of the MS in Computer Science program. There will be no other changes unless programs choose to include ITCS 6190/8190.

### **III. RESOURCES REQUIRED TO SUPPORT PROPOSAL.**

When added resources are not required, indicate “none”. For items which require “none” explain how this determination was made.

- A. **PERSONNEL**. Specify requirements for new faculty, part-time teaching, student assistants and/or increased load on present faculty. List by name qualified faculty members interested in teaching the course(s).

No new faculty are required to teach this course.  
Srinivas Akella, Associate Professor in Computer Science, has developed this course and is interested in offering this course.

- B. **PHYSICAL FACILITY**. Is adequate space available for this course?

No new physical facilities are needed.

- C. **EQUIPMENT AND SUPPLIES**: Has funding been allocated for any special equipment or supplies needed?

No new equipment and supplies are needed to teach the courses.

- D. **COMPUTER**. Specify any computer usage (beyond Moodle) required by students and/or faculty, and include an assessment of the adequacy of software/computing resources by available for the course(s).

Students will use the computing facilities in the Woodward 120 lab and a small Hadoop cluster in Computer Science to complete their course projects and assignments. These facilities are adequate for the course.

- E. **AUDIO-VISUAL**. If there are requirements for audio-visual facilities beyond the standard classroom podiums, please list those here.

This course requires only the use of existing presentation equipment in classrooms. No additional audio/visual equipment or services are needed.

- F. **OTHER RESOURCES**. Specify and estimate cost of other new/added resources required, e.g., travel, communication, printing and binding.

This course does not require any additional resources.

- G. **SOURCE OF FUNDING**. Indicate source(s) of funding for new/additional resources required to support this proposal.

This course does not require any additional funding.

#### **IV. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS**

- A. LIBRARY CONSULTATION.** Indicate written consultation with the Library Reference Staff at the departmental level to ensure that library holdings are adequate to support the proposal prior to its leaving the department. (Attach copy of [Consultation on Library Holdings](#)).

Library consultation was initiated on 8-23-2013 and completed on 8-27-2013 by Dr. Melanie Sorrell (see attached Library Consultation document in Appendix C).

- B. CONSULTATION WITH OTHER DEPARTMENTS OR UNITS.** List departments/units consulted in writing regarding all elements outlined in IIC: Impact Statement, including dates consulted. Summarize results of consultation and attach correspondence. Provide information on voting and dissenting opinions (if applicable).

Sent to Software and Information Systems on 8-27-2013.

Endorsed by Chair of Software and Information Systems on 10-11-2013.

Sent to Bioinformatics and Genomics on 8-27-2013.

Endorsed by Chair of Bioinformatics and Genomics on 8-28-2013.

## **V. INITIATION, ATTACHMENTS AND CONSIDERATION OF THE PROPOSAL**

- A. ORIGINATING UNIT.** Briefly summarize action on the proposal in the originating unit including information on voting and dissenting opinions.

The proposed course was approved by the Department of Computer Science on 9-12-2013.

- B. CREDIT HOUR. (Mandatory if new and/or revised course in proposal)**

Review statement and check box once completed:

- The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a [credit hour](#).

- C. ATTACHMENTS.**

- 1. CONSULTATION:** Attach relevant documentation of consultations with other units.

Endorsed by Chair of Software and Information Systems on 10-11-2013. Attached as Appendix D.

Endorsed by Chair of Bioinformatics and Genomics on 8-28-2013. Attached as Appendix E.

- 2. COURSE OUTLINE/SYLLABUS:**

Attached as Appendix A.

3. PROPOSED CATALOG COPY:

Attached as Appendix B.

a. For a new course or revisions to an existing course, check all the statements that apply:

This course will be cross listed with another course.

There are prerequisites for this course.

There are corequisites for this course.

This course is repeatable for credit.

This course will increase/decrease the number of credits hours currently offered by its program.

This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

b. If overall proposal is for a new degree program that requires approval from General Administration, please contact the [facultygovernance@uncc.edu](mailto:facultygovernance@uncc.edu) for consultation on catalog copy.

4. ACADEMIC PLAN OF STUDY (UNDERGRADUATE ONLY): Does the proposed change impact an existing Academic Plan of Study?

Yes. If yes, please provide updated [Academic Plan of Study](#) in template format.

No.

5. STUDENT LEARNING OUTCOMES: Does this course or curricular change require a change in SLOs or assessment for the degree program?

Yes. If yes, please detail below.

X No.

6. TEXTBOOK COSTS: It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?

X Yes. Briefly explain below.

No. Briefly explain below.

Yes, the proposed textbooks can be made available by textbook rentals and book buyback programs.



**IMPORTANT NOTE:** A Microsoft Word version of the final course and curriculum proposal should be sent to [facultygovernance@uncc.edu](mailto:facultygovernance@uncc.edu) upon approval by the Undergraduate Course and Curriculum Committee and/or Graduate Council chair.

## Appendix A Syllabus

### ITCS 6190/8190: Cloud Computing for Data Analysis

1. Course Number and Title:  
ITCS 6190/8190: Cloud Computing for Data Analysis

2. Course Description (Catalog Description)

**ITCS 6190/8190. Cloud Computing for Data Analysis. (3)** Prerequisites: ITCS 6114 or permission of instructor. Familiarity with Java, Unix, Data structures and Algorithms, Linear Algebra, and Probability and Statistics is expected. Students should have good programming skills and a solid mathematical background. This course will introduce the basic principles of cloud computing for data-intensive applications. It will focus on parallel computing using Google's MapReduce paradigm on Linux clusters, and algorithms for large-scale data analysis applications in web search, information retrieval, computational advertising, and business and scientific data analysis. Students will read and present research papers on these topics, and implement programming projects using Hadoop, an open source implementation of Google's MapReduce technology, and related NoSQL technologies for analyzing unstructured data. (Spring).

3. Pre- or Co-requisites

Prerequisites: ITCS 6114: Algorithms and Data Structures, or permission of instructor.

4. Objectives of the course

The objectives of this course are for students to understand the computational technologies that support Big Data computation. The students will understand the basic principles of cloud computing for data-intensive applications. They will achieve familiarity with parallel computing using Google's MapReduce paradigm on Linux clusters by means of hands-on assignments. They will learn about algorithms for large-scale data processing applications in web search, information retrieval, computational advertising, and scientific data analysis. Students will become familiar with recent research in the area by reading and present research papers on these topics, Students will implement programming projects using Hadoop, an open source implementation of Google's MapReduce technology and related NoSQL technologies for analyzing unstructured data.

## 5. Instructional Method

This will be a classroom-based lecture course. Students will be introduced to material through lectures and demonstrations and gain a deeper knowledge through hands-on application of principles and techniques in homework assignments and a course project.

## 6. Means of student evaluation

The course activities consist of homework and occasional in-class quizzes, programming assignments, a final exam, and a final course project. Students taking the Ph.D. version of the course (ITCS-8190) will also be required to make a classroom presentation on a topic to be selected with the instructor. Homework assignments will be a combination of written homeworks and reading reports on research papers. There will be four programming assignments, which will involve a substantial amount of programming. Students will have about two weeks to do each programming assignment. The final course project will be a significant implementation project, to be selected in consultation with the instructor. In addition to a demonstration and presentation of the project, students must submit a written summary of the project. Projects are to be done individually.

Graduate students taking ITCS-6190 and ITCS-8190 will be graded separately. The grading scheme for the course is as follows:

### ITCS-6190

Homeworks and quizzes: 15%  
Programming assignments: 40%  
Course project: 25%  
Class participation: 5%  
Final exam: 15%

### ITCS-8190

Homeworks and quizzes: 15%  
Programming assignments: 40%  
Course project: 20%  
Class presentation and participation: 10%  
Final exam: 15%

A = 90% or above  
B = 80% or above  
C = 70% or above  
U = below 70%

## 7. Specify policies that apply to this course:

#### a. University integrity

Students are encouraged to discuss course material to improve their understanding of the subject. However they must submit their own work for homeworks, quizzes, programming assignments, exams, and the final course project.

Students are allowed to discuss homeworks. Students must however write their homeworks individually. Copying on this course work is not allowed and will result in a 0 for the submission plus a 5 percentage point penalty on the semester grade and a report to the Dean of Students office.

To ensure academic integrity on programming assignments while permitting students to learn and get help from each other, the following rules will be in force. Students are allowed to work together in interpreting error messages and in finding bugs, but NOT in writing code. Students may not share code, copy code, or discuss code in detail while it is being written or afterwards.

Students may not use code obtained on the web or from other sources (unless permitted by the instructor). Shared or copied code is easy to spot manually and is easily detected using a variety of software tools. Students caught illegally collaborating in writing code or violating the above rules will receive a 0 on the assignment plus a 5 percentage point penalty on their semester grade and a report to the Dean of Students office. Students caught a second time will receive a U (failing grade) in the course and will be reported to the Dean of Students office.

Copying, sharing answers, or using disallowed materials during a quiz or an exam is cheating, of course, and will result in a 0 on the exam, plus a 5 percentage point penalty on the semester grade and a report to the Dean of Students office.

Any student violating these academic honesty rules for a second time will receive a U in the course and will be reported to the Dean of Students office.

Students are responsible for knowing and observing the UNC Charlotte Code of Student Academic Integrity, which defines various forms of academic dishonesty and procedures for responding to them. The Academic Integrity Code is available online at <http://legal.uncc.edu/policies/up-407>. Students found in violation of academic honesty policies will receive a failing grade for the course.

#### b. Attendance

Attendance Policy: Attendance in class is expected and students are responsible for knowing all material covered in class. A portion of the grade will be determined by class attendance and participation.

#### c. Grading policy

A = 90% or above  
B = 80% or above  
C = 70% or above  
U = below 70%

d. Additional requirements such as CPR, liability insurance, no phones or beepers in class (whatever are the requirements for that course).

No additional requirements.

## 8. Probable textbooks or resources

The course has two textbooks:

1. Hadoop: The Definitive Guide, third edition, by Tom White, O'Reilly, 2012.
2. Introduction to Information Retrieval, by Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press. 2008.

## 9. Topical outline of course content

The topics covered in the course include:

- 1 Cloud computing: data intensive distributed computing and big data background
- 2 MapReduce computational model
- 3 Hadoop and Hadoop distributed file system
- 4 NoSQL systems: HBase, Hive
- 5 Information retrieval: Indexing, query processing, ranked retrieval, distributed implementations
- 6 Web search: Link analysis, PageRank, distributed implementations
- 7 Dimensionality reduction: Principal components analysis
- 8 Clustering: k-means, hierarchical clustering, distributed implementations
- 9 Classification: k-Nearest neighbors, Naïve Bayes classification, Logistic regression, Support vector machines, distributed implementations
- 10 Computational advertising

## 10. Attachments

None.

## Appendix B

### Proposed Catalog Copy for ITCS 6190/8190 Course

**ITCS 6190. Cloud Computing for Data Analysis. (3)** Prerequisites: ITCS 6114 or permission of instructor. Familiarity with Java, Unix, Data structures and Algorithms, Linear Algebra, and Probability and Statistics is expected. Students should have good programming skills and a solid mathematical background. This course will introduce the basic principles of cloud computing for data-intensive applications. It will focus on parallel computing using Google's MapReduce paradigm on Linux clusters, and algorithms for large-scale data analysis applications in web search, information retrieval, computational advertising, and business and scientific data analysis. Students will read and present research papers on these topics, and implement programming projects using Hadoop, an open source implementation of Google's MapReduce technology, and related NoSQL technologies for analyzing unstructured data. (Spring).

**ITCS 8190. Cloud Computing for Data Analysis. (3)** Prerequisites: ITCS 6114 or permission of instructor. Familiarity with Java, Unix, Data structures and Algorithms, Linear Algebra, and Probability and Statistics is expected. Students should have good programming skills and a solid mathematical background. This course will introduce the basic principles of cloud computing for data-intensive applications. It will focus on parallel computing using Google's MapReduce paradigm on Linux clusters, and algorithms for large-scale data analysis applications in web search, information retrieval, computational advertising, and business and scientific data analysis. Students will read and present research papers on these topics, and implement programming projects using Hadoop, an open source implementation of Google's MapReduce technology, and related NoSQL technologies for analyzing unstructured data. (Spring).

For a new course or revisions to an existing course, check all the statements that apply:

- This course will be cross listed with another course.
- There are prerequisites for this course.
- There are co-requisites for this course.
- This course is repeatable for credit.
- This course will increase/decrease the number of credits hours currently offered by its program.
- This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

## Appendix C



### J. Murrey Atkins Library

#### Consultation on Library Holdings

**To:** Dr. Srinivas Akella

**From:** Dr. Melanie Sorrell

**Date:** 8/27/013

**Subject:** ITCS 6190/8190 Cloud Computing for Data Analysis

---

#### Summary of Librarian's Evaluation of Holdings:

**Evaluator:** Dr. Melanie Sorrell

**Date:** 8/27/13

#### Check One:

1. Holdings are superior
2. Holdings are adequate
3. Holdings are adequate only if Dept. purchases additional items.
4. Holdings are inadequate

LC Subject Heading	Total items held
Data management	1332 monographs

#### Comments:

This is a proposal for a new graduate level course, which requires one major presentation assignment and smaller reports. Library holdings should be adequate to support student research for this course (see list of items held by subject heading below). Students will have access to relevant databases including INSPEC, Science Direct, Compendex, ACM Digital Library, and Wiley Online Library.

File organization (computer science)	36 monographs
Electronic data processing -- Distributed processing	1882 monographs
Cloud computing	65 monographs
IEEE transactions on cloud computing	Journal title
Annals of Software Engineering	Journal title
ACM SIGMOD Record	Journal title

*Melanie Sorrell*

---

**Evaluator's Signature**

**8/27/13**

---

**Date**



## Appendix D

Re: Consultation for proposed course: Cloud Computing for Data Analysis  
Maher, Mary

To: Akella, Srinivas  
Friday, October 11, 2013 3:06 PM

Srinivas,

Given that you have already consulted with and have approval from the SIS Graduate Curriculum Committee and the PhD coordinator, this also has my approval.

I have one question – is it typical for a course like this to be repeatable for credit?

Mary Lou

-----  
Professor Mary Lou Maher | Chair  
Software Information Systems, Woodward 310A  
UNC Charlotte | 9201 University City Blvd. | Charlotte, NC 28223  
Phone: 704-687-1940 | Fax: 704-687-6065  
[M.maher@uncc.edu](mailto:M.maher@uncc.edu) | <http://sis.uncc.edu/maher-marylou>  
-----

**From:** "Akella, Srinivas" <[sakella@uncc.edu](mailto:sakella@uncc.edu)>  
**Date:** Fri, 11 Oct 2013 14:25:04 -0400  
**To:** Mary Maher <[M.Maher@uncc.edu](mailto:M.Maher@uncc.edu)>  
**Cc:** "Akella, Srinivas" <[sakella@uncc.edu](mailto:sakella@uncc.edu)>  
**Subject:** FW: Consultation for proposed course: Cloud Computing for Data Analysis

Hi Mary Lou,

Here is the reminder regarding the proposed course ITCS 6190: Cloud Computing for Data Analysis, as we just discussed.  
It will be great to get official approval from your department soon since this is on the agenda for the Oct 15 college meeting.

As I mentioned earlier, I have discussed the course with Xintao Wu and Yongge Wang. This course has also received the approval of Yuliang Zheng, Weichao Wang, and Mirsad Hadzikadic, who are on the CCI Graduate Curriculum Committee.

Thanks,  
-Srinivas

---

**From:** Akella, Srinivas  
**Sent:** Tuesday, August 27, 2013 2:47 PM

**To:** Maher, Mary  
**Cc:** Akella, Srinivas  
**Subject:** Consultation for proposed course: Cloud Computing for Data Analysis

Hi Mary Lou,

I am preparing the Long Form for the course ITCS 6190: Cloud Computing for Data Analysis for inclusion in the course catalog. I am attaching the draft long form for consultation and feedback from the SIS department. This course will serve as an elective for CS MS and PhD students, in addition to being an elective course for the proposed Professional Science Masters in Data Science and Business Analytics.

Related courses in your department are Web Mining (ITIS 4500/5500) and Cloud Data Storage (ITIS 6320) taught by Xintao Wu and Yongge Wang respectively. I have been in touch with them regarding the proposed course and do not see significant overlap issues.

Please let me know if you need any additional information. I look forward to hearing from you.

Thanks,  
-Srinivas

---

Srinivas Akella  
Associate Professor  
Department of Computer Science      Tel: (704) 687-8573  
Univ. of North Carolina at Charlotte      Email: [sakella@uncc.edu](mailto:sakella@uncc.edu)  
9201 University City Blvd      WWW: [www.cs.uncc.edu/~sakella](http://www.cs.uncc.edu/~sakella)  
Charlotte, North Carolina 28223

---

## Appendix E

Re: Consultation for proposed course: Cloud Computing for Data Analysis  
Mays, Larry

To: Akella, Srinivas  
Cc: Ribarsky, William  
Wednesday, August 28, 2013 7:16 AM

Dear Srinivas,  
The BiG Department endorses your proposed Cloud Computing course. It is clearly needed. In fact, our Dept has been considering offering such a course for our graduate students. I would strongly urge a small modification of the long form to change the pre-requisite from ITCS 6114 to "ITCS 6114 or permission of instructor". This would allow qualified students from our graduate programs (or indeed others, such as ECE) to take this course.  
Larry

**From:** <Akella>, Srinivas <[sakella@uncc.edu](mailto:sakella@uncc.edu)>  
**Date:** Tuesday, August 27, 2013 2:58 PM  
**To:** Lawrence Mays <[lemays@uncc.edu](mailto:lemays@uncc.edu)>  
**Cc:** "Akella, Srinivas" <[sakella@uncc.edu](mailto:sakella@uncc.edu)>  
**Subject:** Consultation for proposed course: Cloud Computing for Data Analysis

Hi Larry,

I am preparing the Long Form for the course ITCS 6190/8190: Cloud Computing for Data Analysis for inclusion in the course catalog. I am attaching the draft long form for consultation and feedback from the BIG department. This course will serve as an elective for CS MS and PhD students, in addition to being an elective course for the proposed Professional Science Masters in Data Science and Business Analytics.

I do not believe there are overlap issues with existing BINF courses such as BINF 6380 Advanced Bioinformatics Programming and BINF 6382 Accelerated Bioinformatics Programming.

Please let me know if you need any additional information. I look forward to hearing from you.

Thanks,  
-Srinivas

---

Srinivas Akella  
Associate Professor  
Department of Computer Science      Tel: (704) 687-8573  
Univ. of North Carolina at Charlotte      Email: [sakella@uncc.edu](mailto:sakella@uncc.edu)  
9201 University City Blvd      WWW: [www.cs.uncc.edu/~sakella](http://www.cs.uncc.edu/~sakella)  
Charlotte, North Carolina 28223

---