FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER:CIS 2349C

COURSE TITLE: Introduction to Big Data Using Hadoop

PREREQUISITE(S): COP 2034C, COP 2800C, CTS 2437C and CNT 1015 with a grade of C or higher

COREQUISITE(S): None

CREDIT HOURS: 3

CONTACT HOURS/WEEK: 4

CONTACT HOUR BREAKDOWN:

Lecture/Discussion: 3

Laboratory: 1

Other \_\_\_\_\_\_\_\_\_\_\_\_:

FACULTY WORKLOAD POINTS: 3.7

STANDARDIZED CLASS SIZE ALLOCATION: 24

CATALOG COURSE DESCRIPTION:

This course will provide students with an understanding of designing, building, and maintaining Hadoop application. Particular attention will be paid to the Hadoop architecture and the Hadoop ecosystem of tools. Students will learn to apply Hadoop and related Big Data technologies such as MapReduce, Hive, Impala, and Pig in developing analytics and solving the type of problems faced by enterprises today.

SUGGESTED TEXT(S): White,T. *Hadoop: The Definitive Guide*. O’Reilly; latest edition.

IMPLEMENTATION DATE: Fall Term 2018 (2188) – Proposal 2018-32

REVIEW OR MODIFICATION DATE: Spring Term 2020 (2202) – Proposal 2019-28

Fall Term 2020 (2208) - Proposal 2020-07

COURSE TOPICS CONTACT HOURS

PER TOPIC

I. Introduction to Hadoop 3

A. The motivation for Hadoop

B. Hadoop Basic Concepts

C. Hadoop Solutions

II. The Hadoop Ecosystem 4

A. Managing Your Hadoop Solution

B. Introduction to MapReduce

C. Hadoop Cluster

III. MapReduce 4

A. Writing a MapReduce Program in Java

B. Writing a MapReduce Program with the Streaming API

C. Unit Testing MapReduce Programs

IV. Hadoop API 4

V. Practical Development Tips Techniques 3

VI. Practitioners and Reducers 3

VII. Common MapReduce Algorithms 3

VIII. Hadoop Tools for Data Acquisitions, Oozie, and Pig 3

IX. Pig 6

A. Basic Data Analysis with Pig

B. Processing Complex Data with Pig

C. Multi-Dataset Operations with Pig

D. Extending Pig

E. Pig Troubleshooting and Optimization

X. Hive 6

A. Relational Data Analysis with Hive

B. Hive Data Management

C. Text Processing with Hive

D. Hive Optimization

E. Extending Hive

XI. Impala - Analyzing Data with Impala 6

XII. Hands-on Lab Exercises 15

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| **Florida State College at Jacksonville** | | | | | | | | | | | | | **Course Learning Outcomes and Assessment** | | | | | | | | | | | |
| **SECTION 1** | | | | | | | | | | | | | | | | | | | | | | | | |
| Course Prefix and Number: | | | | | CIS 2349C | | | | | | | | | | | Semester Credit Hours (Credit): | | | | | | | | 3 |
| Contact Hours (Workforce): | | | | | | | |  |
| Course Title: | | | | | Introduction to Big Data using Hadoop | | | | | | | | | | | | | | | | | | | |
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| **SECTION 2a *(To be completed for General Education courses only.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
| ***TYPE OF COURSE (Place an “X” in the box next to those that are applicable.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
|  | General Education Core (If selected, core discipline area will be identified in Section 4.) | | | | | | | | | | | | | | | | | | | | | | | |
|  | General Education (If selected, you must also complete Section 4, Section 5, and Section 8) | | | | | | | | | | | | | | | | | | | | | | | |
| **SECTION 2b** | | | | | | | | | | | | | | | | | | | | | | | | |
| ***TYPE OF COURSE (Place an “X” in the box next to those that are applicable.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
|  | A.A. Elective | | | | | | |  | | A.S. Required Course | | | | | | | | | | X | A.S. Professional Elective | | | |
|  | A.A.S. Required Course | | | | | | |  | | A.A.S. Professional Elective | | | | | | | | | |  | Technical Certificate | | | |
|  | PSAV/Clock Hour/Workforce | | | | | | |  | | Development Education | | | | | | | | | |  | Apprenticeship | | | |
|  | Upper Division/Bachelors | | | | | | |  | | Other: | | If selected, use this space to title “other” option. | | | | | | | | | | | | |
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| **SECTION 3** | | | | | | | | | | | | | | | | | | | | | | | | |
| ***INTELLECTUAL COMPETENCIES (Place an “X” in the box next to those that are applicable.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | Reading |  | Speaking | | |  | | Critical Analysis | | | | | |  | | | Qualitative Skills | | | |  | Scientific Method of Inquiry | |
|  | | Writing |  | Listening | | |  | | Information Literacy | | | | | |  | | | Ethical Judgement | | | |  | Working Collaboratively | |
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| **SECTION 4 *(To be completed for General Education courses only.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
| ***GENERAL EDUCATION DISCIPLINE AREA (Place an “X” in the box next to those that are applicable.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
|  | Communications | | | | |  | | | | Humanities | | | |  | | | Mathematics | | | | | | | |
|  | Social and Behavioral Sciences | | | | | | | | | | | | |  | | | Natural Sciences | | | | | | | |
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| **SECTION 5 *(To be completed for General Education courses only.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
| ***GENERAL EDUCATION LEARNING OUTCOME AREA (Place an “X” in the box next to those that are applicable.)*** | | | | | | | | | | | | | | | | | | | | | | | | |
|  | Communication | | | | |  | | | | Critical Thinking | | | |  | | | Information Literacy | | | | | | | |
|  | Scientific and Quantitative Reasoning | | | | | | | | | | | | |  | | | Global Sociocultural Responsibility | | | | | | | |
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| **SECTION 6** | | | | | | | | | | | | | | | | | | | | | | | | |
| ***LEARNING OUTCOMES*** | | | | | | | | | | | ***TYPE OF OUTCOME***  ***(General Education, Course or Program)*** | | | | | | | | ***METHOD OF ASSESSMENT*** | | | | | |
| Students will learn why Hadoop is needed | | | | | | | | | | | Course | | | | | | | | Written testing, classroom and group discussion | | | | | |
| Students will learn concepts of the Hadoop Distributed File System and MapReduce | | | | | | | | | | | Course | | | | | | | | Successful completion on hands-on activities and assignments | | | | | |
| Students will identify problems that Hadoop is useful for solving | | | | | | | | | | | Course | | | | | | | | Successful completion on hands-on activities and assignments | | | | | |
| Students will learn core Hadoop technologies and the Hadoop ecosystem | | | | | | | | | | | Course | | | | | | | | Successful completion on hands-on activities and assignments | | | | | |
| Students will develop MapReduce applications | | | | | | | | | | | Course | | | | | | | | Successful completion on hands-on activities and assignments | | | | | |
| Students will learn common MapReduce algorithms | | | | | | | | | | | Course | | | | | | | | Written and/or hands-on testing, successful completion of hands-on activities and assignments | | | | | |

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| **SECTION 6 (Continued)** |  |  |
| ***LEARNING OUTCOMES*** | ***TYPE OF OUTCOME***  ***(General Education, Course or Program)*** | ***METHOD OF ASSESSMENT*** |
| Student will learn to use Hive and Pig for rapid application development | Course | Written and/or hands-on testing, successful completion of hands-on activities and assignments |

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| **SECTION 7** | | | |
| **Faculty name(s):** | David Singletary and Pamela Brauda | **Date:** | 2/18/2020 |