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Spring 2020

CS 491-104: Computer Science Project (Revised for Remote Learning)

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Senior Project Capstone Courses Syllabus
CS/IT491
(Spring 2020 – Updated version)

Course Identification:

Course: *Senior Project Capstone Course*
Instructor: Osama Eljabiri, PhD

Office: Room 4210 - GITC Building – 4th Floor
Office Hours: Tuesdays 4-6PM (Spring 2020) – using WebEx

Slack-based extended office hours: 6AM-10PM daily support to students through capstone slack communication system.
Live office hours: Online assistance via my WebEx virtual office at:
https://njit.webex.com/meet/oe2
Telephone (973) 642-7123 (voice mail) OR **Cell Phone:** (732) 456-0249 **(preferred)**

Virtual Personal FAX: (866) 605-9416

E-mail: **Osama.eljabiri@njit.edu** or **eljabiri@gmail.com**
Class Time/ Location: As posted on the registrar system plus MOODLE (required)
Virtual Classroom System: http://MOODLE.njit.edu (or moodle.njit.edu)

1. **1. Course Information:**

   A. **Course Number, Title, Credits**
   CS/IT 491, Senior Capstone Project, 3 credits.

   B. **Prerequisites**
   Senior standing. An opportunity for students to integrate the knowledge and skills gained in previous information technology work into a real world team-based project. The project involves investigation of current literature as well as implementation of either a part of a large application or the whole of a small system.

   C. **Course Description**
   The CS/IT Capstone Project is intended to provide a real-world project-based learning experience for seniors in the computer science undergraduate degree. The overall objectives of this course are to investigate the nature and techniques of a business and computing development project. Projects are either provided by industry partners or proposed by students who wish to become entrepreneurs. Entrepreneurship projects (E-teams) are intended to build a foundation for real world businesses. Eteams' project proposals are reviewed by a panel of expert judges prior to approval. E-teams are mentored and evaluated by an entrepreneurship board of industry, university and alumni advisors. Eteams will carry out market research, target real world stakeholders and validate solutions using quantitative analysis based on customers' feedback via questionnaires.

   The course involves business analysis, business modeling, project management, feasibility analysis, risk analysis, R&D, requirements engineering, system design, implementation, quality assurance, documentation and presentation of a real world business problem and solution. The course is

interdisciplinary in nature where students use their collective knowledge in business and technology to provide creative solutions in collaboration with real world project stakeholders.

2. Course Features and Objectives:

A- Features:

This course has unique features that are not currently offered through any other course on campus. These features are:

- It provides hands-on multidisciplinary real world experiences that integrate business applications with information technology areas such as multimedia and network security .
- It strengthens the 4-year college curriculum by enabling students to use what they learn collectively and creatively.
- It simulates the real-world environment internally in the structure of students' teams and course "virtual organization".
- It offers dynamic market-driven training that reflects hot topics highly demanded by industry but not usually covered through a static college curriculum.
- It enables students to master career-oriented skills such as leadership, presentation, entrepreneurship, social and communication skills.
- It shows how both IT and business knowledge are used to solve real-world IT problems.
- The experience gained working on such projects will make students more employable by industry including the ability of building businesses through the entrepreneurship track.

B- Specific goals for the course

Students who complete this course successfully will have:

- Ability to breakdown complex problems into manageable pieces (using WBS and Gantt).

- Ability to identify project risks and suggest strategies to minimize them.

- Ability to define project stakeholders, scope & requirements (including the use of FDD).
- Ability to capture, map and visualize the design of the proposed solution identifying key components and their relationships (examples: class diagram, ERM, network diagram, system architecture, etc.)
- Ability to implement the solution successfully using software and/or hardware technologies or other project-related tools (via prototypes).
- Ability to test (validate and verify) the quality of the executed solution using user feedback and other testing techniques.
- Ability to communicate a value proposition of the project to various stakeholders including the ability to explain, convince, engage and impress.
- Ability to organize the presentation in a meaningful and professional fashion including mastering personal and collaboration presentation skills.

Accordingly, the general outcomes of this course include:

(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(h) Recognition of the need for and an ability to engage in continuing professional development (i) An ability to use current techniques, skills, and tools necessary for computing practice.

(k) An ability to apply design and development principles in the construction of software systems of varying complexity.

3. Course Details:

A. Course outline with approximate week-by-week schedule (subject to change if necessary) Please see detailed weekly agenda on MOODLE for course schedule, deliverables and milestone events throughout the semester.
<u>NOTE:</u> **Due to Covid-19 impact on our ability to run F-T-F events, we have changed the format for midterm and final presentations to be submitted, presented and judged virtually through MOODLE and GOOGLE Drive, including live WebEx presentations for certain tracks of the capstone program. All adjustments and instructions are available through MOODLE, Slack and Google Drive.**

B. References

- Software Engineering: Theory and Practice, Second Edition by Shari Lawrence Pfleeger.

- Information Technology Project Management, Fourth Edition, Kathy Schwalbe, ISBN: 0619215267 © 200.

- Modern Systems Analysis and Design by Jeffrey A. Hoffer, Joey F. George and Joseph S. Valacich, Third edition, Addison Wesley *(ISBN: 0-13-033990-3)*

- Software Engineering, Ian Somerville, Addison-Wesley, 6th edition, 2005, ISBN 0- 201-39815X

C. Number of hours of lecture, recitation, and laboratory

Students work on real-world entrepreneurial, industry sponsored or research development projects for the entire 14 weeks of the semester. The problem solving process is broken down into five "Sprints". A sprint is a 2-3 week time-boxed duration or project phase that allows students and project's stakeholders to manage change, risk and complexity and adapt to skillsets and project requirements through evolutionary prototyping. Lectures and training will include a comprehensive crash course in the few weeks and some on-demand training (when available) throughout the semester. Starting from the third or fourth week of the semester, students will be required to have frequent team meetings (at least once a week face to face) and frequent client meetings (at least once every two weeks). Additional hands-on training, project management training and laboratory hours will also be included.

GRADING POLICIES

Your final grade in this course will be based on the percentage of points that you receive out of the total possible points for the course (1100). Grades will be determined according to the following scale:

90% - 100%	A
85%- 89%	B+
80% - 84%	B
75%- 79%	C+
70% - 74%	C
60% - 69%	D
0% - 59%	F

Capstone project options include:

- Industry Projects.

- Entrepreneurship Teams.

- RWC Developing, Teaching and Mentoring project tracks for MS/HS local students on Saturdays or internationally during school breaks (Spring & Summer breaks)

- Executive Team Project (overall management of the capstone enterprise).

- CISCO Academy (only for IT students in Network and information security concentration)

Note: RWC is Real World Connections program for MS/HS students coached by advanced students, alumni, industry experts and faculty.

Adjusted Capstone Evaluation Criteria
(Due to change in presentations format)
Spring 2020

Criterion	Percentage	Explanation
Attendance	By deduction	3% deduction for every class absence
		2% deduction for each other group meeting absence
Capstone Training	5% (50 points)	Attending mandatory training sessions
Sprint 1 Deliverables online	4 % (40 points)	Sprint 1 Deliverables: Signed scope document & Gantt
Midterm Presentation	15% (150 points)	In-class Midterm Presentation 5% of midterm grade is based on sponsor feedback
2 Sprints presentations to sponsors Sprints 1 & 2	6 % (60 points)	2 x 50= 100 points (Sprint 1 and 2) – Verified by progress report submitted by team leader
Full Attendance and Participation at the final Showcase (Sprint 4)	0% (Cancelled)	Full attendance from set-ups to clean-ups Excellent table/ poster preparation

Final product Evaluated by Sponsor/ Online sponsor evaluation form)	**Client Evaluation** **35% (350 points)**	**Final working solution** **(Tested and installed)**
Final presentation Evaluated by judges at final presentations	**20%** **(200 points)**	**Present both MDDDE and solution implementation**
Final Project MOODLE submission (Evaluated by instructor & advanced peers)	**5%** **(50 points)**	*Your submission should include:* - *Refined/expanded/updated final PPT of the project according to MDDDE* - *Short and/or Long CAMTESIA* - *An electronic copy of your showcase material*
Final Report **OR** **Capstone CISCO Academy** *(when applicable)*	**10%** **(100 points)**	*Your choice of one of two options that must be completed successfully and verified by deliverables* *or* *feedback*
Extra Credits	*Up to (100 points)* *10%*	**Leading a team successfully** **Being an effective part of the executive team**
Total *Max* *Total*		**1000 points** *1100 points*

Please note that:
- Class attendance, and in-Class /online participation and collaboration is very important
- In-group participation and attendance is extremely significant in determining your final letter grade.

Honors students:

To earn the honors-credit, you need to do one of five options (based on availability and interest):

1- Become a project manager for an industry capstone team and lead it successfully.

2- Join two projects instead of one, which depends on availability and currently is either very limited or not allowed (TBA).

3- Propose an entrepreneurship project to start your own business and lead this project to success.

4- Become a member of the coaching team to develop and teach a curriculum for HS students successfully on Saturdays or internationally during Spring or Summer breaks.

5- Join the executive team of the YWCC capstone program *(extremely limited in space, very hard to get approved and very-time consuming. Yet, very rewarding, exciting and challenging).*