# http://www.ric.edu/webcommunications/images/SealWithText_Small_Black.pngUNDERGRADUATE CURRICULUM COMMITTEE (UCC) PROPOSAL FORM

## Cover page scroll over blue text to see further important[instructions](#instructions):please read.

**N.B. DO NOT USE HIGHLIGHT, pleaseDELETE THE WORDS THAT DO NOT APPLY TO YOUR PROPOSAL**

**ALL numbers in section (A) need to be completed, including the impact ones.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A.1. [Course or program](#Proposal) | **CSCI 437 Network Architectures and programming** | | | |  |
| [Replacing](#Ifapplicable) | **CSCI 437 Introduction to Data and Computer Communications** | | | |
| A.2. [Proposal type](#type) | **Course: revision** | | | |
| A.3. [Originator](#Originator) | **Stephanie Costa**  **Qian Liu** | [Home department](#home_dept) | **Mathematics & Computer Science** | | |
| A.4. [Context and Rationale](#Rationale) | We would like to move from three to four credits to allow for additional important topics to be covered in the course such as flow control, congestion control, as well as more programming work in network protocols. Given this course is a required elective in a group that offers several choices of 3 or 4 credit courses, increasing the credit of this one in that group will not affect the overall total credits of either the BS or BA in CSCI.  The revised CSCI 437 course will place emphasis on the software level:  1. The course will use the Internet as the vehicle for students to study the fundamentals of computer networks, and to practice and explore widely used networking technologies. The Internet serves as an excellent example of a highly distributed and complicated network, its layered architecture, protocols, and organizations have profound effect on the design of other networks and protocols.  2. The course will use simulation tools to illustrate network switching and routing techniques. Students would have practice on configuring, and modifying switch forwarding table and routing table to experience how computers and subnets are connected together, and how communication takes place.  3. The course will introduce how to use Wireshark to capture network data packets, and how to analyze captured data packets. Network packet analysis is one of the most important techniques in network research and development.  4. The course will cover socket programming, the fundamental interface that network applications rely on. Students would use sockets to get familiar with the client/server model, the base model in network service, and to implement their own client/server model applications. | | | | |
| A.5. [Student impact](#student_impact) | **The revised course will offer students more useful and current content** | | | | |
| A.6. [Impact on other programs](#impact) | **None** | | | | |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty): | **Existing Faculty** | | | |
| [*Library*:](#library) | **None** | | | |
| [*Technology*](#technology) | **None** | | | |
| [*Facilities*](#facilities): | **None** | | | |
| A.8. [Semester effective](#Semester_effective) | **Fall 2018** | A.9. [Rationale if sooner than next Fall](#Semester_effective) | | **N/A** | |

B. [NEW OR REVISED COURSES](#delete_if)**DO NOT use highlight. Delete this whole page if the proposal does not include a new or revised course.**

|  | Old ([for revisions only](#Revisions)) Only include information that is being revised, otherwise leave blank (delete provided examples that do not apply) | New Examples are provided for guidance, delete the ones that do not apply |
| --- | --- | --- |
| B.1. [Course prefix and number](#cours_title) | **CSCI 437** |  |
| B.2. Cross listing number if any |  |  |
| B.3. [Course title](#title) | **Introduction to Data and Computer Communications** | **Network Architectures and Programming** |
| B.4. [Course description](#description) | Data and computer communications are discussed through the topics of data transmission, data encoding, digital data communication techniques, data link control, multiplexing, and networking. | An introduction to fundamental concepts of computer networks. Topics include the Internet reference model, TCP/IP, flow control, congestion control, routing, switching, network programming, and data capturing and analysis. |
| B.5. [Prerequisite(s)](#prereqs) |  |  |
| B.6. [Offered](#Offered) |  |  |
| B.7. [Contact hours](#contacthours) | **3** | **4** |
| B.8. [Credit hours](#credits) | **3** | **4** |
| B.9. [Justify differences if any](#differences) |  | |
| B.10. [Grading system](#grading) |  |  |
| B.11. [Instructional methods](#instr_methods) |  |  |
| B.12.[Categories](#required) |  |  |
| B.13. Is this an Honors course? |  |  |
| B.14. [General Education](#ge)  N.B. Connections must include at least 50% Standard Classroom instruction. |  |  |
| B.15. [How will student performance be evaluated?](#performance) |  |  |
| B.16. [Redundancy statement](#competing) |  | **Despite a similarity in title to CIS421 Networks and Infrastructure, CSCI 437 focuses more on programming and TCP/IP implementation details.** |
| B. 17. Other changes, if any |  | |

| B.18**.**[**Course learning outcomes**](#outcomes)**: List each one in a separate row** | [**Professional Org.Standard(s)**](#standards)**, if relevant** | [**How will each outcome be measured**](#measured)**?** |
| --- | --- | --- |
| Understanding of the fundamentals of computer networks, layered architecture, TCP/IP protocols, and crucial techniques in each layer |  | Exams, Quizzes, Assignments |
| Understanding of network packet analysis |  | Exams, Quizzes |
| Implement client/server model by using socket API (Application Programming Interface) |  | Programming assignments |

| B.19. [**Topical outline**](#outline)**: Do NOT insert whole syllabus, we just need a two-tier outline** |
| --- |
| Basic concepts and network fundamentals 1.5 - 2 weeks  *Network categories, features, functionalities, services.*  *Layered architecture.*  *Performance measurement*  *IP subnet, mask*  *ARP*  *Linux OS*  Application layer 1.5 week  *Protocols such as HTTP, DNS, SMTP, SDN, etc*  *Client/server model*  Transport layer 3 weeks  *Principles, and functions of the layer*  *TCP, UDP*  *L4 flow control, congestion control*  *Network programming*  Network layer 2.5 weeks  *Fundamental concepts*  *IP protocol*  *ICMP*  *IPv4 and IPv6*  *QoS*  *Routing*  Link/Physical layer 2.5 weeks  *Layer fundamentals*  *Ethernet*  *IEEE 802.x standards*  *L2 flow control, congestion control*  *Packet capturing and analysis*  Computer security 1 week  *Introduction, encryption, key certificate*  Advanced topics in computer networks 0.5 - 1 week  *High Performance Networks, difference, advantages, discussions*  Testing and Review 1 week  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Total 14 weeks |

D. Signatures

* Changes that affect General Education in any way MUST be approved by ALL Deans and COGE Chair.
* Changes that directly impact more than one department/program MUST have the signatures of all relevant department chairs, program directors, and relevant dean (e.g. when creating/revising a program using courses from other departments/programs). Check UCC manual 4.2 for further guidelines on whether the signatures need to be approval or acknowledgement.
* Proposals that do not have appropriate approval signatures will not be considered.
* Type in name of person signing and their position/affiliation.
* Send electronic files of this proposal and accompanying catalog copy to [curriculum@ric.edu](mailto:curriculum@ric.edu) and a printed or electronic signature copy of this form to the current Chair of UCC. Check UCC website for due dates.

##### D.1. Approvals: required from programs/departments/deans who originate the proposal. may include multiple departments, e.g., for joint/interdisciplinary prposals.

| Name | Position/affiliation | [Signature](#_Signature" \o "Insert electronic signature, if available, in this column) | Date |
| --- | --- | --- | --- |
| Stephanie Costa | Chair of Mathematics & Computer Science |  |  |
| Earl Simson | Dean of Faculty of Arts and Sciences |  |  |

##### D.2. [Acknowledgements](#acknowledge): REQUIRED from OTHER PROGRAMS/DEPARTMENTS IMPACTED BY THE PROPOSAL. SIGNATURE DOES NOT INDICATE APPROVAL, ONLY AWARENESS THAT THE PROPOSAL IS BEING SUBMITTED. CONCERNS SHOULD BE BROUGHT TO THE UCC COMMITTEE MEETING FOR DISCUSSION

| Name | Position/affiliation | [Signature](#Signature_2) | Date |
| --- | --- | --- | --- |
| Jeffrey Mello | Dean of School of Business |  |  |
| Lisa Bain | Chair CIS and Accounting |  |  |