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UNIVERSITY REGISTRAR
VIRGINIA TECH

# Prerequisite/Corequisite Change Request
*(Existing Courses)*

| General Information | | | |
|---|---|---|---|
| **Date:** | 3/26/21 | ***Effective Term:** | Summer 2021 |
| **College/Department:** | Engineering/Computer Science | | |
| **Course Designator and Number** *(Cross-listed Course Designator and Number):* | CS 5244 | | |
| **Title of Course:** | Web Application Development | | |
| **Instructor and/or Department Contact:** | Trey Mayo - Director of Graduate Programs | | |
| **Contact Phone:** | | **Contact E-mail:** | treymayo@vt.edu |

| Prerequisite Enforced | |
|---|---|
| *Enable prerequisite enforcement?* | ☐ Yes ☒ No |

**Add** the following Prerequisite/Corequisites:

None

*Attach department **letter of support** to include a non-departmental course as a prerequisite/corequisite.*

**Drop** the Following Prerequisites/Corequisites:

None

List Course Prerequisites/Corequisites **after change:**

CS 5044

Justification *(Justify prerequisite/corequisite changes and remaining prerequisites/corequisites after change)*

Department has determined that the pre-req of CS 5044 does not need to be enforced in Banner.

*If adding a minimum grade as a prerequisite for a course, data must be provided to clearly show the need for that minimum grade in order to be successful in the course. Minimum grade requirements may not be used as a way to limit enrollment.*

*If request is being processed for the upcoming **effective term:**

- Requests to **ADD** prerequisite requirements (i.e., turn enforcement **ON**, add grade restriction, add course) must be processed prior to the opening of "course request" for the applicable effective term.
- Requests to **REMOVE** prerequisite requirements (i.e., turn enforcement **OFF**, remove a grade restriction, drop course) may be completed at any time, unless the removal causes the course to be more restrictive.

| Approval Signatures | | | |
|---|---|---|---|
| *Department Head/Chair* | | *Date* | 3/30/2021 |
| *College Curriculum Committee Representative* | Alexandra Lowesse | *Date* | 3/31/21 |
| *College Dean* | S M Akers | *Date* | 3/31/21 |



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# Web Application Development
# CS 5244

## I – Catalog Description

Languages and technologies needed to develop modern data-centric web applications. Commonly used protocols and standards. Client-side technologies such as HTML, CSS, and JavaScript; server-side technologies such as Servlets and JSP; and database access with SQL. Principles and technologies for web application architecture, electronic commerce, and web application security. Pre: 5044 (3C, 3H)

**Course Number: 5244**
**Transcript (ADP) Title: Web Application Development**

## II – Learning Objectives

Having successfully completed this course, the student will be able to:

- Implement a data-centric web application such as an e-commerce application, that includes authentication, authorization, session handling, resource management, and user history.
- Explain fundamental internet and web protocols and their characteristics, including TCP, UDP, and HTTP.
- Apply client-side web technologies including HTML, CSS, and JavaScript, in the implementation of basic web application designs.
- Apply server-side web technologies such as Java Servlets and JSP, in the creation of dynamic web content.
- Analyze application security issues related to web-based, systems, including authentication, authorization, confidentiality, and data integrity.

## III – Justification

Software development is increasingly concerned with creating systems and applications that are executed in the context of the internet and the world-wide web. Electronic commerce, mobile applications, and cloud computing are some of the more important manifestations of this trend. This course is needed to provide students with core skills in data-centric web application development, especially as used in e-commerce web sites. In the context of the MIT (Masters of Information Technology) program, it serves as a sister course to BIT 5594 (Web Applications and Electronic Commerce). BIT 5594 approaches web applications from a business standpoint, and CS 5244 teaches students the fundamentals of constructing those applications. CS 5244 can also serve as a gateway to courses such as mobile application development, cloud computing, and web-based security.

5000-level credit is required for this course. Students need an appropriate background at the 5000-level in object-oriented programming (as in CS 5044). Students working independently will demonstrate the ability to adapt and innovate to solve problems in the design and implementation of dynamic web pages and the databases that web applications access. They

will master the capacity to critically analyze protocols, tools, security strategies, and architectures used in the development of e-commerce web applications. Because this course is aimed primarily at employed professionals the concepts and techniques are presented in a more mature and informed manner, drawing on the experience of the student in a way not possible with undergraduate students. The course topics are more directly connected with the pragmatic aspects of web-application development that are important to a community of employed professionals.

## IV – Prerequisites and Corequisites

Pre: 5044 Object-Oriented Programming with Java

## V – Texts and Special Teaching Aids

An example of texts that might be used for a Java-centric version of this course would be:

Basham, B., Sierra, K., & Bates, B. (2008). Head First Servlets and JSP (2nd ed.). O'Reilly Media. Pp. xxxii, 789.
Kurniawan, B. (2015). Servlet and JSP: A Tutorial (2nd ed.). Brainy Software. Pp. x, 496

## VI – Syllabus

| Topic | Description/Examples | Percent of Course |
|---|---|---|
| **Network and Application Protocols** | TCP/IP/UDP<br>HTTP | 20% |
| **Database Concepts** | Relational Databases<br>SQL | 10% |
| **Client-Side Web Technologies** | HTML/CSS<br>JavaScript<br>XML | 25% |
| **Server-Side Web Technologies** | Java Servlets/JSP<br>EJB/JPA<br>MVC Architecture | 25% |
| **Security** | | 10% |
| **Advanced Topics** | | 10% |
| **Total** | | 100% |

VII – Old (Current) Syllabus

| Topic | Description/Examples | Percent of Course |
|---|---|---|
| **Introduction** | | 5% |
| **Network and Application Protocols** | TCP/IP/UDP<br>MIME<br>HTTP<br>SMTP/POP | 20% |
| **Application and Programmer Interfaces** | Communication and Concurrency<br>Database and Legacy Resources<br>Component-based Services | 35% |
| **Security** | | 10% |
| **Document Representations** | HTML/JavaScript<br>Multimedia formats<br>XML | 20% |
| **Advanced Topics** | | 10% |
| **Total** | | 100% |