



CS415

**NETWORK PROGRAMMING**

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**ANNOTATION**

The discipline considers communication based on the TCP and UDP network protocols. Microsoft technologies are used: the C# programming language, the .NET framework and the Visual Studio Integrated Development Environment. Building on these means, the high-level network programming approach based on the HTTP protocol is introduced. Development of practical applications using network communication is demonstrated.

**MAIN OBJECTIVES**

The main goal of the course is to acquire knowledge and skills for the development of applications based on network protocols using Microsoft technologies: the C# programming language and the .NET framework. After successful completion of the course, students will be able to:

- Know and work with TCP and UDP network protocols;
- Use classes allowing exchange of information on the TCP and UDP protocols;
- Master basic network communication capabilities based on the HTTP protocol.

**PREREQUISITES**

Students must have attended the following courses: Programming, Object Oriented Programming, Operating Systems and Computer Networks and Communications.

**STATUS AND STRUCTURE**

Specialty	Status	Credits	Full-time study				Part-time study			
			L	S	P	Total	L	S	P	Total
Software Engineering	Mandatory	6	30	30	-	60	15	15	-	30
Computer Systems and Technologies	Selectable	6	30	30	-	60	15	15	-	30

## COURSE CONTENT

1. Internet & Sockets
2. HTTP & Server
3. Model-View-Controller
4. Object-Relational Mapping
5. REST API
6. Consuming REST API

## PLANNED LEARNING ACTIVITIES AND TEACHING METHODS

### Teaching methods

- Attended lectures and seminar exercises
- Practical Education
- Interactive learning
- Visual learning
- E-learning through the Moodle and Microsoft Teams platforms

### Teaching aids

- Independent work
- Practical tasks
- Solving tasks using application software
- Educational video materials including video presentations
- Use of electronic resources in the Moodle and Microsoft Teams platforms in the form of theoretical materials, tests and tasks for independent work on each topic

## ASSESSMENT METHODS

Each student's work during the semester is evaluated in points. They are obtained as a result of classroom and non-classroom activities of the student, as well as an examination procedure, which is a test with opened and closed-type questions. The maximum number of points that a student can collect is 300, and their distribution by evaluated activities is as follows:

1. Auditorium activities ..... **100** points
2. Outside-classroom activities ..... **100** points
3. Examination procedure..... **100** points

The final grade is formed by distributing the points on the scale:

- from 100 to 150 points = Medium (3);
- from 151 to 200 points = Good (4);
- from 201 to 250 points = Very good (5);
- from 251 to 300 points = Excellent (6).

## RECOMMENDED LITERATURE

1. Andrew Troelsen, Philip Japikse. Pro C# 10 with .NET 6: Foundational Principles and Practices in Programming. Apress. ISBN: 978-1484278680. 2022.  
<https://www.amazon.com/Pro-NET-Foundational-Principles-Programming/dp/1484278682>
2. Carl-Hugo Marcotte. An Atypical ASP.NET Core 6 Design Patterns Guide: A SOLID adventure into architectural principles and design patterns using .NET 6 and C# 10, 2nd edition. Packt Publishing. ASIN: B09RZY84J. 2022.  
[https://www.amazon.in/Atypical-ASP-NET-Design-Patterns-Guide-ebook/dp/B09RZY84J/ref=sr\\_1\\_3?crd=2Q9KVJML2Z7B&keywords=asp.net+core+6&qid=1656506243&s=digital-text&prefix=asp.net+core+6%2Cdigital-text%2C96&sr=1-3](https://www.amazon.in/Atypical-ASP-NET-Design-Patterns-Guide-ebook/dp/B09RZY84J/ref=sr_1_3?crd=2Q9KVJML2Z7B&keywords=asp.net+core+6&qid=1656506243&s=digital-text&prefix=asp.net+core+6%2Cdigital-text%2C96&sr=1-3)
3. Gabriel Baptista. Software Architecture with C# 10 and .NET 6: Develop software solutions using microservices, DevOps, EF Core, and design patterns for Azure, 3rd Edition. Packt Publishing. ASIN: B09QKXPCWN. 2022.  
[https://www.amazon.in/Software-Architecture-NET-solutions-microservices-ebook/dp/B09QKXPCWN/ref=pd\\_sbs\\_scl\\_1\\_2/261-8264984-3877860?pd\\_rd\\_w=2O8ve&content-id=amzn1.sym.d3163d45-cad5-462b-8a7b-a5eb87482d2c&pf\\_rd\\_p=d3163d45-cad5-462b-8a7b-a5eb87482d2c&pf\\_rd\\_r=2CH7FBCKR37C5CX4C2F3&pd\\_rd\\_wg=vfDVu&pd\\_rd\\_r=eedfdce7-1e8b-477f-b13b-41e0d1318229&pd\\_rd\\_i=B09QKXPCWN&psc=1](https://www.amazon.in/Software-Architecture-NET-solutions-microservices-ebook/dp/B09QKXPCWN/ref=pd_sbs_scl_1_2/261-8264984-3877860?pd_rd_w=2O8ve&content-id=amzn1.sym.d3163d45-cad5-462b-8a7b-a5eb87482d2c&pf_rd_p=d3163d45-cad5-462b-8a7b-a5eb87482d2c&pf_rd_r=2CH7FBCKR37C5CX4C2F3&pd_rd_wg=vfDVu&pd_rd_r=eedfdce7-1e8b-477f-b13b-41e0d1318229&pd_rd_i=B09QKXPCWN&psc=1)
4. Mark J. Price. C# 10 and .NET 6 – Modern Cross-Platform Development: Build apps, websites, and services with ASP.NET Core 6, Blazor, and EF Core 6 using Visual Studio 2022 and Visual Studio Code, 6th Edition. Packt Publishing. ISBN: 1801077363. 2021.  
[https://www.amazon.in/10-NET-Cross-Platform-Development-websites-ebook/dp/B09JV37DM6/ref=sr\\_1\\_12?crd=2Q9KVJML2Z7B&keywords=asp.net+core+6&qid=1656506243&s=digital-text&prefix=asp.net+core+6%2Cdigital-text%2C96&sr=1-12](https://www.amazon.in/10-NET-Cross-Platform-Development-websites-ebook/dp/B09JV37DM6/ref=sr_1_12?crd=2Q9KVJML2Z7B&keywords=asp.net+core+6&qid=1656506243&s=digital-text&prefix=asp.net+core+6%2Cdigital-text%2C96&sr=1-12)
5. Sean Burns. Hands-On Network Programming with C# and .NET Core: Build robust network applications with C# and .NET Core. Packt Publishing. ISBN: 978-1789340761. 2019.  
<https://www.amazon.com/Hands-Network-Programming-NET-Core/dp/1789340764>
6. Gaurav Aroraa, Tadit Dash. Building RESTful Web Services with .NET Core. Packt Publishing. ISBN: 9781788291576. 2018. <https://www.amazon.com/dp/1788291573>
7. Tim Moors. Guide to Internet Programming with Sockets. Springer. ISBN: 978-0387954585. 2006.  
<https://www.amazon.com/Guide-Internet-Programming-Sockets-Moors/dp/0387954589>
8. David Makofske, Michael J. Donahoo, Kenneth L. Calvert. TCP/IP Sockets in C#: Practical Guide for Programmers. ISBN: 978-0124660519. 2004.  
<https://www.amazon.com/TCP-IP-Sockets-Practical-Programmers/dp/0123745403>
9. Fiach Reid. Network Programming in .NET: With C# and Visual Basic .NET. Digital Press. ISBN: 978-1555583156. 2004.  
[https://www.amazon.com/Network-Programming-NET-Visual-Basic/dp/1555583156/ref=sr\\_1\\_1?crd=QDEPRD23NYXE&keywords=Network+Programming+in+.NET%3A+With+C%23+and+Visual+Basic+.NET&qid=1656507442&s=books&prefix=network+programming+in+.net+with+c+and+visual+basic+.net%2Cstripbooks-intl-ship%2C153&sr=1-1](https://www.amazon.com/Network-Programming-NET-Visual-Basic/dp/1555583156/ref=sr_1_1?crd=QDEPRD23NYXE&keywords=Network+Programming+in+.NET%3A+With+C%23+and+Visual+Basic+.NET&qid=1656507442&s=books&prefix=network+programming+in+.net+with+c+and+visual+basic+.net%2Cstripbooks-intl-ship%2C153&sr=1-1)
10. Richard Blum. C# Network Programming. Sybex. ISBN: 978-0782141764. 2002.  
[https://www.amazon.com/C-Network-Programming-Richard-Blum/dp/0782141765/ref=sr\\_1\\_2?crd=1WSN9RS7652S2&keywords=C%23+Network+Programming&qid=1656507460&s=books&prefix=c+network+programming%2Cstripbooks-intl-ship%2C152&sr=1-2](https://www.amazon.com/C-Network-Programming-Richard-Blum/dp/0782141765/ref=sr_1_2?crd=1WSN9RS7652S2&keywords=C%23+Network+Programming&qid=1656507460&s=books&prefix=c+network+programming%2Cstripbooks-intl-ship%2C152&sr=1-2)

## INTERNET RESOURCES

1. **БСУ // ЕО** – платформа за електронно обучение на Бургаски свободен университет  
<https://e-learn.bfu.bg>
2. **Microsoft Documentation** - in-depth articles on Microsoft developer tools and technologies.  
<https://docs.microsoft.com/en-us/documentation/>
3. **ИТ Кариера** - Електронно хранилище с учебни материали по националната програма "Обучение за ИТ кариера" на Министерството на образованието и науката (МОН) за придобиване на професия "Приложен програмист".  
<https://github.com/dimitarminchev/ITCareer>
4. **School Programming** - Публично хранилище за свободно учебно съдържание по програмиране, информатика и ИТ за българските училища.  
<https://github.com/BG-IT-Edu/School-Programming>
5. **Проект "Професия приложен програмист"** – Фондация "Софтуерен университет" съвместно със софтуерната индустрия, индустриалните ИТ асоциации и МОН, участва в разработката на учебни програми и качествено съвременно учебно съдържание за обучение на ученици в средните професионални гимназии.  
<https://softuni.foundation/projects/applied-software-developer-profession/>