**ABET**

**Preliminary Self-Study Report**

**For the**

*cOMPUTER sCIENCE bACHELOR pROGRAM*

*At*

*iV.jAVAKLHISHVILI Tbilisi State University*

**Chavchavadze Ave. 3**

**Tbilisi, georgia**

**November 27, 2016**

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# BACKGROUND INFORMATION

## A. Contact Information

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## B. Faculty History

The Faculty of Exact and Natural Sciences has a rich and flexible academic organization. Highly qualified professors, teachers, and growing material-technical base create excellent grounds for training competent professionals. Currently, the faculty has 8 departments: departments of mathematics, physics, chemistry, geography, computer sciences, biology, geology, electric and electronic engineering. 11 bachelor’s, 18 master’s and 10 doctoral degree programs operate at the faculty. A part of the programs has been developed based on the recommendations from foreign experts, while some programs are implemented with the direct involvement of foreign professors. Bachelor degree program ‘’Computer Sciences (French Georgian)’’ issues 2 diplomas – diplomas of Tbilisi State University and University of Paris8.; successful graduates of master’s program ‘’Medical Molecular Biology’’ also get two diplomas – diplomas of the Tbilisi State University and the University of Westminster; some of the doctoral programs are joint and are implemented through the collaboration with foreign universities. 32 educational-scientific laboratories, 18 scientific-research institutes, and 3 educational (retraining) centers operate at the faculty. The faculty is known for its outstanding scientific activities. 39 scientific directions comprise a wide range of research activities. The faculty undertakes a number of scientific projects funded by national and international foundations. 20 scientists and students received international and local scholarships during 2008-2011 academic years. Every year, nearly 80 scientific works are published in journals with higher impact factor. Many scientific-technological innovations are patented. The faculty systematically organizes international and local scientific conferences, scientific seminars with the participation of the faculty employees and Ph.D. students. The faculty employees publish own textbooks and monographs. The faculty provides its students with the updated course of lectures through online learning system. The faculty students systematically participate in international Olympiads and competitions in mathematics and information science and achieve serious success. Students of all the three stages of the faculty are actively involved in scientific activities. The faculty students take part in exchange programs, undertake scientific and educational activities at foreign universities and scientific centers. Every year the faculty organizes students’ scientific conferences. The faculty also manages to reward successful students and finance their tuition and trips from the Gifted Students’ Encouragement Foundation. The Unijunior, which aims at enhancing young learners’ interest in science, systematically operates at the faculty. Young learners have an opportunity to attend popular public lectures, to undertake practical and laboratory studies, to have field practices and excursions, to participate in Olympiads and quizzes. In addition, the faculty organizes summer schools for the young learners during summer holidays. The faculty infrastructure is improving every year; necessary equipment has been purchased with the help of the university, national and international foundations. The computer classrooms and laboratories have been equipped with modern technologies.

In 2006 the Program “Computer Science” for Bachelor degree in accordance of ACM curriculum recommendation was developed. From 2006 to 2011 updates in accordance of EQE ([NATIONAL CENTER FOR EDUCATIONAL QUALITY ENHANCEMENT) was applied and in 2011 it got the accreditation from EQE. In order to keep uptodate standards in computer science and keep track of industry requirements the professionals(from industry) are regularly invited to lead practical advance courses (ASP, JAVA,etc).](http://eqe.gov.ge/geo) As a shape effect the employment issue was improved significantly, for instance around 85% of our graduates are emplyed nowadays. Our alumnus are employed nationally as well as internationally. The of BOG (bank of Georgia) the one of the biggest banks in Georgia is employing around 80% of its IT department staff from our graduates. Nearly the same picture we have in other banks like TBC,Bank of Republic, Liberty Bank , etc. The employment area is covering almost all state institutions and private sectors.

Around 30-40% of our graduates are continuing their staduings for Master and Phd programs nationally and internationally (ETH, Max Plank Institution, etc).

## Organizational Structure of the Department

## DEPARTMENT OF COMPUTER SCIENSE

**ORGANIZATION CHART**

Department Chair

**Manana Khachidze**

# ummaa

TA, GA and

Post Docs

Department Support

**Alexander Gamkrelidze**

Faculty /

Lecturers

Graduate Advisor

**Koba Gelashvili**

Technician

Grad Program Support

**Irina khutsishvili**

Student Assistants

##

## D. Program Delivery Modes

The Computer Science program is offered as an on-campus day program. Our academic year is divided into two semesters. Each semester (Fall and Spring) is 15 weeks of instruction, with the sixteenth week used for final examinations. The Contact hours (lecture/practice/workshop/lab) are typically 3 semester units and meets for three 50- minute periods each week.

Required Computer Science courses are offered every semester, and most electives are offered at least once a year. Most undergraduate courses are offered during the day.

**There are three basic Program Delivery Modes:**

**Lectures**: Verbal, problem-based learning (PBL), demonstration method, induction, deduction, analysis and synthesis.

**Seminars, Practical and Laboratory Teaching:** Verbal, book based method, laboratory and demonstration methods, practical methods, induction methods, analysis method, and synthesis method, electronic attending (E-learning).

**Team Projects**: Verbal, PBL, E-learning, cooperative learning, collaborative work.

## E. Program Locations

The program is offered in the Iv. Javakhishvili Tbilisi State University building XI.

## F. Public Disclosure

Program Educational objectives, Student outcomes, annual student enrollment and graduation data are available on our website: <https://www.tsu.ge/en/faculties/science>.

## G. Deficiencies, weaknesses or concerns from Previous Evaluation(s) and the Actions taken to address them.

The Acreditation by the NATIONAL CENTER FOR EDUCATIONAL QUALITY ENHANCEMENT was held in Autumn, 2011 no concerns were established;

The program was reviewed in 2013 by the representatives of ABET. Some recommendations in accordance of ABET Criterions were established;

CRITERION 1: STUDENTS

## Student Admissions

New student admission is managed by a nationwide examination and admissions process. Credit for courses taken by transfer students at another institution is done by a central office. There is no credit given for work in lieu of courses. Graduation requirements are checked by advisors, by a commission at the faculty level, and by the central administration.

In order to be admitted to the CS program at Iv. Javakhishvili Tbilisi State University a student should pass:

1. Mathematics along with other exams organized by the National Assessment and Examinations Center (NAEC) and receive enough scores to be admitted to the Exact and Natural Sciences Faculty and Alternatively, he/she has to pass Calculus Course in another accredited high education institution equivalent to the Exact and Natural Sciences Calculus Course level.
2. Algorithms and Data Structures , OOP1(C++) in the second term

**Note: Thus, only starting from third semester student is appointed to the Program Of Computer Sciences (for example: in 2009 from 797 faculty freshmen only 346 was appointed to Computer Sciences Program in Autumn 2010)**

**Figure 1: Freshmen Admission Trends**

|  |  |  |
| --- | --- | --- |
|  | Freshmen | Total Faculty Enrolment |
| 2009-2010 | 797 | 1502 |
| 2010-2011 | 339 | 1165 |
| 2011-2012 | 480 |  |
| 2012-2013 | 949 | 1593 |
| 2013-2014 | 500 |  |
| 2014-2015 | 696 |  |
| 2015-2016 | 561 |  |

**Table 1: History of Total Freshman Enrollment over the Past 6 Years**

**Figure 1.1: Admission Trends – Average Composite Mathematic Scores (NAEC)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Courses** | **Fall 2015** | **Spring 2015** | **Fall 2016** | **Spring 2016** |
| CS 1 | **Total Number of Students** | **Number of Sections 2** | **Total Number of Students** | **Number of Sections 2** | **Total Number of Students** | **Number of Sections 2** | **Total Number of Students** | **Number of Sections 1** |
| 31 | Sec 1: 20Sec 2: 11 | 28 | Sec 1: 15Sec 2: 13 | 45 | Sec 1: 20Sec 2: 25 | 43 | Sec 1: 20Sec 2: 23 |
| CS 2 | **Total Number of Students** | **Number of Sections 1** | **Total Number of Students** | **Number of Sections 2** | **Total Number of Students** | **Number of Sections 1** | **Total Number of Students** | **Number of Sections 1** |
| 19 | Sec 1: 19 | 34 | Sec 1: 17Sec 2: 17 | 32 | Sec 1: 32 | 18 | Sec 1: 18 |

**Figure 1.1: Admission Trends – By Sections**

## Evaluating Student Performance

Student Performance is evaluated a maximum of 100 scores. 40 of which is the final exam of the subject. Students’ work and study success are evaluated according to the syllabus of each course, which is a combination of midterm and final exams. Midterm can be evaluated by test, presentation in the class, team or individual projects. Forms of a midterm evaluation may vary for different subjects.

**Grading System of the CS Program is coherent with the TSU standard grading system:**

|  |  |  |
| --- | --- | --- |
| Evaluation  | Scores | GPA |
| A | 91-100 | 4.0 |
| B | 81-90 | 3.0 |
| C | 71-80 | 2.0 |
| D | 61-60 | 1.0 |
| E | 51-60 | 0.5 |
| F-FX | 0-50 | 0.0 |

**Table 2: TSU Grading System**

## Transfer Students and Transfer Courses

There are two types of Student Transfer in Georgia. A transfer from one higher education institution to another and a transfer from one program to another within the higher education institution (internal transfer).

First, is centralized by the Legal Entity of Public Law (LEPL) – National Center for Educational Quality Enhancement. It is regulated by the Ministerial Order №10/N of 2010, 4th of December. Student transfer can take place twice a year during the fall and spring semesters. For more information visit student transfer website [www.students.eqe.ge](http://www.students.eqe.ge).

The second type of student transfer is administered by the higher education institutions. Internal transfer in the Iv. Javakhishvili Tbilisi State University is regulated by the Article 7 of the University Council Resolution N77/2011.

Internal Transfer can only be done after completion of the first semester. Students cannot transfer during their additional semesters.

For internal transfer students can visit websites:

Bachelor: <http://sms.tsu.ge/StudMobiloba/>

Master: <http://lms.tsu.ge/>

**Validating Transfer Courses**

Transfer courses will be validated according to the program objectives and the similarity of the course outcomes.

## D. Advising and Career Guidance

Students in Tbilisi State University receive constant advising and career guidance by their professors. Even though there is no centralized administration for career advice, students can visit professors during the open hours for any kind of career guidance.

## F. Graduation Requirements

In order for a student to graduate, he/she should have a minimum of 240 credits including all the required courses.

## G. Transcripts of Recent Graduates

The department will provide transcripts requested by the ABET team with any needed explanation of how the transcripts are to be interpreted.

Table 1-2. Transfer Students for Past Five Academic Years

|  |  |
| --- | --- |
| Academic Year | Number of Transfer Students Enrolled |
| 2014 | 51 |
| 2013 | 52 |
| 2012 | 42 |
| 2011 | 24 |
| 2010 | 33 |

Table 1-3. Enrollment Trends for Past Five Academic Years

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Year 2011 | Year 2012 | Year 2013 | Year 2015 | Year 2016 |
| Full-time Students |  |  |  |  |  |
| Part-time Students |  |  |  |  |  |
| Student FTE1 |  |  |  |  |  |
| Graduates |  |  |  |  |  |

1 FTE = Full-Time Equivalent

# CRITERION 2: PROGRAM EDUCATIONAL OBJECTIVES

## A. Mission Statement

**1. University Mission Statement**

The Ivane Javakhishvili Tbilisi State University (TSU) is a spiritual and intellectual successor of multi-century Georgian culture, humanistic traditions and old Georgian educational, scientific and cultural centers.

The mission of this first Georgian university is:

* To establish national and universal values;
* To promote the intellectual, moral, cultural and socio-economic development of the society;
* To develop the university traditions through innovative research and learning;
* To protect academic freedom;
* To take care of personal and professional development of students and professors;
* To create, maintain and transfer knowledge;
* To develop basic and applied research studies;
* To promote student-centered learning and to train competitive staff;
* To promote continuing education;
* To develop international academic and scientific collaboration;
* To provide honorary membership of the free global university society.

**2. Faculty Mission**

The faculty of exact and natural sciences collectively involves students in an academic experience of the highest quality based on the following principles:

* To provide an excellent learning environment wherein all students may refine the knowledge and skills essential to cultivate their ability to think critically, communicate effectively, and advance their appreciation of artistic and scientific inquiry;
* To provide a contemporary education through the integration of information technology into the study of disciplines traditionally associated with the arts and sciences; and
* To stress the importance of lifelong learning through community outreach, service, research and creative endeavors.

## 2. Program Educational Objectives

The educational objectives for the Computer Science undergraduate program are to produce alumni(ae) who can:

1. Become productive, responsible computing science professionals capable of conducting research and/or designing, developing, or maintaining projects in the various areas of computer science.

2. Understand and apply ethical issues and social aspects of computing science in performing their duties as computer science professionals. 3. Continue the learning of new technologies in the computer science area through self-directed professional development or post graduate education.

Graduates of the Computer Science Program will be able to demonstrate skills in problem-solving and sufficient technical expertise to begin either immediate employment or advanced study in Computer Science.

Our program provides students both theoretical and practical foundations needed to be successful. Through classroom and lab activities, opportunities for research, and early involvement in professional organizations, including programming competitions, the Department of Computer Science seeks to educate a well-rounded computing professional capable of independent thinking.

# CRITERION 3: STUDENT OUTCOMES

## A. Student Outcomes

## B. Relationship of Student Outcomes to Program Educational Objectives

The relationship between the program objectives and the student outcomes is given in the following table.

# CRITERION 4: CONTINUOUS IMPROVEMENT

## A. Student Outcomes

### **A.1 Relationship of Courses in the Curriculum to Student Outcomes**

### **A.2. Achievement of Student Outcomes**

### **A.3 Course Outcomes Assessment**

### **A.4 Results of Student Outcomes Assessment**

## B. Continuous Improvement

### **B.1. Actions to Improve the Program**

New advisory board has been established first meeting is planned for Second half of April;

New Curriculum according ABET last recommendations and in accordance of New qualification framework was prepared (see the attachment).

### **B.2 Curriculum changes**

2017 :

the following elective cources were added in the curriculum:

|  |  |  |
| --- | --- | --- |
| Title of the Course | Format and prerequisites | Credits |
| Base of Game Development | 1/0/0/2, 1 lecture + 2 labprerequisites 1. OOP2
2. Algorithms and Data Structures
 | 5 |
| Software Testing | 1/0/0/2, 1 lecture + 2 labprerequisites OOP2 | 5 |
| Effective modern C++ | 1/0/0/1, 1 lecture + 1 labprerequisites 1. OOP 1( C++), min 61points and up
2. Algorithms and Data Structures , min 61points and up
3. English Language(10 credits)
 | 5 |

### **B.3 Prerequisites, title changes and/or course descriptions**

2013:

Prerequisites had been changed for the following courses:

1. Data Analysis and Statistics:

|  |  |
| --- | --- |
| Was1. Discrete Structures
2. Calcullus for CS
 | Become:1) Calcullus for CS |

1. Programming in Java(advanced)

|  |  |
| --- | --- |
| Was1. OOP2 (Java)
 | Become:1. OOP2 (Java) with minimum Grade 61 and up
2. English Language(10 credits)
3. Databases
 |

2014:

Title was changed for:

Software package “Mathematica 7 “and its capabilities become Software package “Mathematica“ and its capabilities

Prerequisites changed for Computer Architecture and Design:

|  |  |
| --- | --- |
| Was1. Basic of Programming
2. OOP 1
3. Operation Systems
4. Computer Skills
 | Become:1) OOP1(C++) |

2015:

Prerequisites changed for

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Subject** | **was** | **become** |
|  | The Technologies of the Information Security  | 1. Discrete Structures
2. Algorithm Design
 | Linear Algebra and Analytical Geomethry |
|  | Behavioral models of discrete systems | Discrete structures | Data Analysis and Statistics |
|  | Operating System Linux for Servers  | 1. Operating Systems2. Network Technologies and Communications | Operating Systems |

Title was changed for **Fundamentals of programming of dynamic WEB-pages**, it become **Javascript for Dynamic Web-pages.**

2017:

Prerequesits were changed for:

Advance Course of Algorithms

|  |  |
| --- | --- |
| Was1. OOP1 (C++)
2. Algorithms and Data Structures
 | Become:1. OOP1 (C++) min 61 points and up
2. Algorithms and Data Structures min points 61 and up
3. English(10 credits)
 |

### **B.4 Changes in Course Delivery**

The following courses delivery was chanched:

2013:

OOP2 (Programming in Java) (from 1/0/1/1 to 2/0/0/1)

Functional Programming in Haskel (from 1/0/1/1 to 1/0/0/2)

Programming in Java(advanced) (from 1/0/1/1 to 2/0/0/1)

## C. Additional Documentation

**CRITERION 5. Curriculum**

**A. Program Curriculum**

Curriculum should be aligns with the student outcomes and corresponding educational objectives. Each major course should contributes to the development of learning toward the desired student learning outcomes

The program provides the possibility to choose the Major (obligatory), Minor and Free lectures.

The Major program includes the so called University courses, Faculty courses and the core and electivre courses in the main subject (see appendix), 160 ECT in total: Elective Courses – 40 ECT, Main (core) courses – 120 ECT, among them 10 ECT for a group project, and 30 ECT for faculty courses.

Free Courses: 20 ECT

Minor Courses: 60 ECT

**Curriculum**

Faculty of Exact and Natural Sciences

Department of Computer Sciences

Name of the study program: Computer Science

**The effective date of the study program (academic year): 2011-2015**

|  |  |
| --- | --- |
| **Faculty courses / modules** |  |
| **Faculty (core) compulsory courses / modules** |  |
|  | **Name of the course / module** | **ECTS** | **Contact/ independent work hours****lecture / practice / seminar / laboratory** | **Requirements for admission to the course / module** | **Semesters of the study** **(Autumn / Spring)** | **Lecturer / Lecturers** | **Recommended Semester** |
|  | Foreign Language | 10 | 120/1300/4/0/0  |  | Autumn, Spring  |  | II, III |
|  | Computer skills and IT | 5 | 30/950/0/0/2 |  | Autumn |  | I |
|  | Calculus 2 | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  |  |  |  |  |  |  |  |
| **Faculty (core) elective courses / modules** |  |
|  | **Name of the course / module**  | **ECTS** | **Contact/ independent work hours****lecture / practice / seminar / laboratory** | **Requirements for admission to the course / module**  | **Semesters of the study** **(Autumn / Spring)** | **Lecturer / Lecturers**  | **Recommended Semester** |
|  | Introduction to Physics | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  | Introduction to Chemistry | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  | Introduction to Electronics | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  | Introduction to Biology | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  | Introduction to Geography | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  | Introduction to Geology | 5 | 60/652/2/0/0 |  | Autumn |  | I |
| **Compulsory courses / modules of specialty (specialization)** |  |
|  | **Name of the course / module**  | **ECTS** | **Contact/ independent work hours****lecture / practice / seminar / laboratory** | **Requirements for admission to the course / module**  | **Semesters of the study** **(Autumn / Spring)** | **Lecturer / Lecturers**  | **Recommended Semester** |
|  | Basics of Programming  | 5 | 75/502/2/0/1 |  | Autumn |  | I |
|  | Linear Algebra and Analytical Geometry | 5 | 60/652/2/0/0 |  | Autumn |  | I |
|  | Algorithms and Data Structures | 10 | 90/1603/2/0/1 | Basics of Programming  | Spring |  | II |
|  | Object Oriented Programming 1 (C ++) | 10 | 90/1602/2/0/2 | Basics of Programming  | Spring |  | II |
|  | Calculus for Computer Science | 5 | 45/801/2/0/0 | 1. Calculus
2. Linear Algebra and Analytical Geometry
 | Spring |  | II |
|  | Discrete structures | 5 | 60/651/2/1/0 | Linear Algebra and Analytical Geometry | Autumn |  | III |
|  | Numerical Methods: Design, Analysis and Computer Implementation of Algorithms | 5 | 60/651/1/1/1 | 1. Calculus
2. Linear Algebra and Analytical Geometry
3. Basics of Programming
 | Autumn |  | III |
|  | Design of Algorithms | 5 | 45/801/1/1/0 | Algorithms and Data Structures | Autumn |  | III |
|  | Object Oriented Programming 2 ( Java, C#, VBA) | 5 | 45/802/0/0/1- Java1/0/0/2 - C#1/1/0/1 - VBA | 1. Object Oriented Programming 1 (C ++)
2. Foreign Language 2 (English) for Java
 | Autumn /Spring |  | III, IV, V, VI |
|  | Mathematical Programming | 5 | 45/801/2/0/0 | Calculus for Computer Science | Spring |  | IV |
|  | Data Base | 5 | 60/651/0/1/2 | 1. Basics of Programming
2. Object Oriented Programming 1
3. Computer skills and IT
 | Spring |  | IV |
|  | Data Analysis and Statistics | 5 | 60/651/0/2/1 | Calculus for Computer Science  | Spring |  | IV |
|  | Operations Research | 5 | 45/801/1/0/1 | Mathematical Programming | Autumn |  | V |
|  | Operating systems | 5 | 45/801/0/1/1 | Object Oriented Programming 1 (C ++)  | Autumn |  | V |
|  | Modeling and Simulation | 5 | 60/651/0/2/1 | Data Analysis and Statistics | Autumn |  | V |
|  | Intelligence systems | 5 | 45/801/0/1/1 | 1. Object Oriented Programming 1
2. Design of Algorithms
 | Autumn |  | VI |
|  | Network Technologies and Communications | 5 | 45/801/0/0/2 | Operating systems | Autumn |  | VI |
|  | Software Engineering | 5 | 30/951/0/1/0 | 1. Design of Algorithms
2. Object Oriented Programming 2
 | Autumn |  | VII |
|  | Computer Architecture and Organization | 5 | 45/801/0/1/1 | 1. Basics of Programming
2. Object Oriented Programming 1
3. Computer skills and IT
4. Operating systems
 | Autumn |  | VII |
| **Elective courses / modules of specialty (specialization)** |  |
|  | **Name of the course / module**  | **ECTS** | **Contact/ independent work hours****lecture / practice / seminar / laboratory** | **Requirements for admission to the course / module**  | **Semesters of the study** **(Autumn / Spring)** | **Lecturer / Lecturers**  | **Recommended Semester** |
| ***Theoretical Informatics*** |
|  | Elements of Computer Algebra | 5 | 30/951/1/0/0 | 1. Calculus
2. Linear Algebra and Analytical Geometry
3. Basics of Programming
4. Algorithms and Data Structures
 | Autumn /Spring |  | IV-VIII |
|  | Algorithmic Information Theory | 5 | 30/951/1/0/0 | 1. Basics of Programming
2. Algorithms and Data Structures
 | Autumn /Spring |  | IV-VIII |
|  | Algorithms for Computational Topology | 5 | 30/951/1/0/0 | 1. Basics of Programming
2. Algorithms and Data Structures
 | Autumn /Spring |  | IV-VIII |
|  | Combinatorial Optimization | 5 | 45/801/0/1/1 |  Operations Research | Autumn /Spring |  | VI-VIII |
|  | Introduction to Complexity Theory | 5 | 30/951/1/0/0 | 1. Basics of Programming
2. Algorithms and Data Structures
 | Autumn /Spring |  | IV-VIII |
|  | Information Retrieval | 5 | 30/951/1/0/0 | 1. Basics of Programming
2. Calculus
 | Autumn /Spring |  | IV-VIII |
| ***Practical Informatics*** |
|  | Mathematical computer system MATLAB | 5 | 45/801/0/0/2 | 1. Computer skills and IT
2. Calculus
 | Autumn /Spring |  | III-VIII |
|  |  “Mathematica 7“ and its capabilities | 5 | 45/801/0/0/2 | 1. Computer skills and IT
2. Calculus
 | Autumn /Spring |  | III-VIII |
|  | Functional Programming using Haskell | 5 | 45/801/0/0/2 | Basics of Programming  (anti - condition – Advances in Discrete Structures: the programming language Haskell) | Autumn /Spring |  | III-VIII |
|  | ADO.NET technology - data access from NET application | 5 | 30/951/0/0/1 | 1. Object Oriented Programming 2 (C#) > 65 point
 | Autumn /Spring |  | III-VIII |
|  | ASP.NET technology – creating of WEB - applications  | 5 | 30/951/0/0/1 | 1. Object Oriented Programming 2 (C#)

> 65 point | Autumn /Spring |  | III-VIII |
|  | Advanced course of Algorithms  | 10 | 45/2051/0/0/2 | 1. Object Oriented Programming 1(C++)
2. Algorithms and Data Structures
 | Autumn /Spring |  | III-VIII |
|  | Implementations of Algorithms and Data Structures | 5 | 45/801/0/0/2 | 1. Object Oriented Programming 1 (C++) ( > 70 point)
2. Algorithms and Data Structures ( > 70 point )
 | Autumn /Spring |  | III-VIII |
|  | Programming with Java (Advanced Course) | 5 | 45/802/0/0/1 | 1. Object Oriented Programming 2 (Java)

 > 60 point1. English (10 ECT)
2. Data Base
 | Autumn /Spring |  | III-VIII |
| ***Applied Informatics*** |
|  | Information Management  | 5 | 45/802/0/1/0 | Computer skills and IT | Autumn /Spring |  |  |
|  | Formal Languages and Finite Automats | 5 | 45/801/2/0/0 | Discrete structures | Autumn /Spring |  | III-VIII |
|  | Genetic Algorithms | 5 | 45/801/0/1/1 | Design of Algorithms | Autumn /Spring |  | III-VIII |
|  | Neural Networks  | 5 | 45/801/0/1/1 | Discrete structures | Autumn /Spring |  | III-VIII |
|  | Behavioral models of discrete systems | 5 | 45/801/2/0/0 | Discrete structures | Autumn /Spring |  | IV-VIII |
|  | The Technologies of the Information Security | 5 | 45/801/1/1/0 | 1. Discrete structures
2. Design of Algorithms
 | Autumn /Spring |  | III-VIII |
|  | Cryptographic Algorithms | 5 | 45/801/1/1/0 | Discrete structures | Autumn /Spring |  | III-VIII |
|  | Information Theory and Coding  | 5 | 45/801/1/1/0 | Discrete structures | Autumn /Spring |  | III-VIII |
|  | Information Models and Systems-1 | 5 | 45/801/2/0/0 | Algorithms and Data Structures | Autumn /Spring |  | III-VIII |
|  | Information Models and Systems-2 | 5 | 45/801/0/0/2 | Algorithms and Data Structures | Autumn /Spring |  | III-VIII |
| ***Technical Informatics*** |
|  | Network Technologies and Communications 2 | 5 | 45/801/0/0/2 | Network Technologies and Communications  | Autumn /Spring |  | V-VIII |
|  | Operating System Linux for Servers | 5 | 45/801/0/0/2 | 1. Operating systems2. Network Technologies and Communications | Autumn /Spring |  | V-VIII |
|  | Quantum Informatics  | 5 | 45/801/0/2/0 | 1. Algorithms and Data Structures
2. Discrete structures
 | Autumn /Spring |  | V-VIII |
|  | WEB Design | 5 | 45/801/0/0/2 | 1. Computer skills and IT
2. Basics of Programming
 | Autumn /Spring |  | III-VIII |
|  | Fundamentals of programming of dynamic WEB-pages | 5 | 45/801/0/0/2 |  WEB Design | Autumn /Spring |  | IV-VIII |
|  | Data Description and Analysis with Spreadsheets | 5 | 45/801/0/0/2 | 1. Computer skills and IT
2. Basics of Programming
 | Autumn /Spring |  | III-VIII |
|  | Creating and Managing Projects with Microsoft Project | 5 | 45/801/0/0/2 | 1. Computer skills and IT
2. Basics of Programming
 | Autumn /Spring |  | III-VIII |
|  | Operating systems installation and management of the user element  | 5 | 45/801/0/0/2 | Computer skills and IT | Autumn /Spring |  | III-VIII |
|  | MS Office  | 5 | 45/801/0/0/2 | Computer skills and IT | Autumn /Spring |  | III-VIII |
|  | e-Learning instruments in Education process | 5 | 45/801/0/0/2 | Computer skills and IT | Autumn /Spring |  | III-VIII |
|  | Developing technologies of Knowledge bases | 5 | 45/801/0/2/0 | Data Base | Autumn /Spring |  | III-VIII |
|  | Operating system for mobile devices | 5 | 45/801/0/1/1 | Object Oriented Programming 2 (Java) | Autumn /Spring |  | V-VIII |
|  | Sensory Computer Systems | 5 | 45/801/0/0/2 | Computer skills and IT | Autumn /Spring |  | IV-VIII |
|  | Software tools in Science and Business | 5 | 45/801/0/0/2 | Computer skills and IT | Autumn /Spring |  | IV-VIII |
|  | Database Web Design | 5 | 45/801/0/0/2 | 1. Data Base
2. WEB Design
 | Autumn /Spring |  | IV-VIII |
| ***The block of Mathematical Logic and Discrete Structures*** |
|  | Advances in Discrete Structures: the programming language Haskell | 5 | 45/801/0/0/2 | 1. Discrete structures
2. Basics of Programming

(anti - condition – Functional Programming using Haskell) | Autumn /Spring |  | III-VIII |
|  | Computer Implementation of Discrete Structure Problems | 5 | 45/801/0/0/2 | Calculus  | Autumn /Spring |  | III-VIII |
|  | Fuzzy logic with applications | 5 | 45/801/2/0/0 | Discrete structures  | Autumn /Spring |  | III-VIII |
| ***The block of Numerical Analysis and Computing Technologies*** |
|  | Modeling with Ordinary Differential Equations (Project) | 5 | 30/951/0/1/0 | Numerical Methods: Design, Analysis and Computer Implementation of Algorithms | Autumn /Spring |  | IV-VIII |
|  | Modeling with Partial Differential Equations (Project) | 5 | 30/950/0/1/1 | Numerical Methods: Design, Analysis and Computer Implementation of Algorithms | Autumn /Spring |  | IV-VIII |
|  | Mathematical modeling technologies | 5 | 45/801/0/1/1 | Numerical Methods: Design, Analysis and Computer Implementation of Algorithms | Autumn /Spring |  | IV-VIII |
| ***Research-oriented block*** |
|  | Team Project or Bachelor's thesis  | 10 | 30/2201/0/1/0 | Software Engineering | Spring |  | VIII |

**B. Course Syllabi**

The syllabi are displayed in Appendix A**.**

1. **Advisory Committee**

The Industrial Advisory Board expectation; Example TSU computer science graduates to be not only technically competent and effective in communication skills, but to be able to perform problem solving at these higher levels.

 **EXAMPLE….. WE need to do the same ( we will do it after the meeting will be hold)**

**C. Advisory Committee Industrial Advisory Board Meeting Agenda Friday; April 24, 2013; 9:00 am – 1:00 pm**

**Attendees:**

Affan Badar; Todd Alberts; Mehran Shahhosseini – MET Faculty/ISU Jianren Rong – Program Chair, Design Tech - Ivy Tech Community College Mak Koie – Emeritus Professor of ISU Tom Newsom – Sony DADC Greg stewart – Unison Engine Components Gary Oxford – Bemis Marc Ponsot – A P Machine & Tool Inc. Mary McCarter – Kellogg Justin Bargo – Watchfire Signs Larry Parvin – Great Dane Trailers Michael Westerfield – Taghleef Industries

**Agenda:**

* **Chair’s welcome State of the Computer Science program**
* **Update on ABET Accreditation Assessment status of the CS program Recommendations**

**MET Industrial Advisory Board Members**

**Academia:**

Dr. A. Mehran

Dr. M. Affan

**Industry:**

Marc Ponsot (our alumni) Manager - A P Machine & Tool Inc.

Sony DADC Tom Newsom (graduate),

**b. One year of science and mathematics**

**i. Mathematics.**

Students pursuing the BSCS degree are required to take the following Mathematics courses (21 hours):

MATH 2305 Discrete Mathematics

MATH 3328 Linear Algebra I

MATH 2413 Calculus and Analytic Geometry I

MATH 2414 Calculus and Analytic Geometry II

MATH 3435 Calculus and Analytic Geometry III

MATH 3370 Introduction to the Theory of Statistical Inference

**ii. Science.**

Students pursuing the BSCS degree are required to **take three** of these courses from the following Lab Science courses (12 hours), in no particular sequence:

BIOL 1406 General Biology I

BIOL 1407 General Biology II

CHEM 1411 General Chemistry I

CHEM 1412 General Chemistry II

 PHYS 2425 Calculus-based Physics I

PHYS 2426 Calculus-based Physics II

**iii. Program structure:**

* **Prerequisite structure path diagram**
* **Capstone team project; final year project**
* **TSU Career Center is fully engaged in developing and overseeing internship opportunities ; (example) CS 351 – Cooperative Industrial Practice**

**Table 5-1** describes the plan of study for students in the Computer Science major, along with average section enrollments over the two years

PLEASE INSERT YOUR UPDATED TABLE