

# "POLITEHNICA" UNIVERSITY FROM TIMIȘOARA

## SYLLABUS for the course:

### *MATHEMATICS ASSISTED BY COMPUTER*

**FACULTY: AUTOMATION AND COMPUTERS**

**DOMAIN / SPECIALIZATION: CIVIL ENGINEERING, ELECTRONICS-  
COMMUNICATIONS, COMPUTERS AND INFORMATION TECHNOLOGY – P.I.**

**Year of studies: I**

**Semester: 2**

|  |   |                                     |  |  |                |
|--|---|-------------------------------------|--|--|----------------|
| <b>Course instructor: Lector dr. Maria Anastasia Jivulescu</b> |   |                                     |  |  |                |
| <b>Application instructors:</b>                                | <i>Asist. dr. Olivia Bundau</i>         | <i>Asist. dr. Catalin Vasii</i>     | <i>Asist. drd. Remus Ene</i>             |  |                |
| <b>Număr de ore/săptămână / Verificarea / Credite</b>          |   |                                     |  |  |                |
| <b>Course</b>  | <b>Seminar</b>                          | <b>Laboratory</b>                   | <b>Project</b>                           | <b>Evaluation</b>                      | <b>Credits</b> |
| 2  | 1                                       | 1                                   |  | Exam                                   | 4              |
| <b>Statul disciplinei</b>                                      | Fundamentală x <input type="checkbox"/> | În domeniu <input type="checkbox"/> | De specialitate <input type="checkbox"/> | Complementară <input type="checkbox"/> |                |
|  | Obligatorie: Impusă                     | x <input type="checkbox"/>          | Opțională <input type="checkbox"/>       | Facultativă <input type="checkbox"/>   |                |

#### **A. COURSE OBJECTIVES**

*The assimilation by students of the methods and knowledge of special mathematics used in electronic engineering, civil engineering, mechanics and the ability of using MATLAB software.*

#### **B. COURSE SUBJECTS (28 hours)**

*Complex functions (9 hours): Elementary complex functions; Holomorphic functions; Curve (contour) integral in the complex plane; Series expansions; Residues; Applications of Residues theorem.*

*Integral operators (8 hours): Fourier Transform; Laplace Transform; Z Transform.*

*Distributions (5 hours): Definition of the distribution; Remarkable examples; Operations with distributions; Tempered distributions.*

*Probability and stochastic processes (6 hours): Probability spaces; Random variables; Stochastic processes-Markov chains, Poisson processes; Time series – white and colored noises; Diffusion processes; Mathematical statistics;*

#### **C. APPLICATIONS SUBJECTS (tutorial 14 hours)**

*At the seminars, applications corresponding to the course subjects are presented: Problems for Complex functions (5 hours); Problems for integral transforms (4 hours); Problems for distribution (2 hours); Problems with discrete and continuous random variable (2 hours); Descriptive statistics (1 hour).*

*Laboratories: Numerical methods. Probability and stochastic processes in MATLAB: Introduction to Matlab software (2 hours); Numerical solutions for nonlinear equations (1 hour); Numerical integration (1 hour); Numerical solutions for differential equations (2 hours); Interpolation and approximation functions(2 hours) ; Classical schemes(1 hour); Descriptive statistics (1 hour); Simulation of the random variables (2 hours); Simple paths for stochastic processes (2 hours).*

#### **D. TEXTBOOKS/REFERENCES**

1. P.Naslau, R.Negrea, L.Cadariu, B. Caruntu, s.a., *Matematici asistate de calculator*; Editura Politehnica, Timisoara, 2005, (2nd ed.2006, 3rd ed. 2007) (in Romanian).
2. P. Gavruta, R. Negrea, L. Cadariu, L. Ciurdariu, *Matematici pentru ingineri*; Editura Politehnica, Timisoara, 2008. (in Romanian).
3. R. Negrea, B.Caruntu, C. Hedrea, *Advanced Calculus in EGINEERING*, Ed. Politehnica, 2009 .
4. <http://ocw.mit.edu/OcwWeb/Mathematics/>

#### **E. EVALUATION PROCEDURE**

*Distributed evaluation – two written examination (1.5 hours for each part): 50 % of the final grade.*

*Home-works and in-class evaluations during the term: 50% of the final grade.*

#### **F. INTERNATIONAL COMPATIBILITY**

*Universidad Politecnica de Valencia; University of Canberra; University of Manitoba; Western Washington University.*

Date: 18.10.2012

#### **HEAD OF DEPARTMENT**

Conf.dr. Ioan GOLEȚ

#### **COURSE INSTRUCTOR,**

Lector dr. Maria - Anastasia Jivulescu