

| Faculty of Fundamental Problems of Technology | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------|-----------|------------|---------|---------|
| COURSE CARD | | | | | | |
| Name in polish | : | Systemy VLSI | | | | |
| Name in english | : | VLSI Systems | | | | |
| Field of study | : | Computer Science | | | | |
| Specialty (if applicable) | : | | | | | |
| Undergraduate degree and form of | : | masters, stationary | | | | |
| Type of course | : | optional | | | | |
| Course code | : | E2_W17 | | | | |
| Group rate | : | Yes | | | | |
| | | Lectures | Exercides | Laboratory | Project | Seminar |
| Number of classes held in schools (ZZU) | | 30 | 30 | | | |
| The total number of hours of student work-load (CNPS) | | 90 | 90 | | | |
| Assesment | | pass | | | | |
| For a group of courses final course mark | | X | | | | |
| Number of ECTS credits | | 3 | 3 | | | |
| including the number of points corresponding to the classes of practical (P) | | | 3 | | | |
| including the number of points corresponding occupations requiring direct contact (BK) | | 3 | 3 | | | |
| PREREQUISITES FOR KNOWLEDGE, SKILLS AND OTHER POWERS | | | | | | |
| Algorithms and data structures | | | | | | |
| COURSE OBJECTIVES | | | | | | |
| C1 Knowledge of the basic algorithmic problems and techniques in VLSI design | | | | | | |
| C2 Deeper understanding of some selected problems | | | | | | |
| COURSE LEARNING OUTCOMES | | | | | | |
| The scope of the student's knowledge: | | | | | | |
| W1 Current technology, fabrication and limitations of physical impelmentation of digital cuircits. | | | | | | |
| W2 Methods of digital cuircuit implemetations on logical gates and transistors and the standard methodologies of VLSI design | | | | | | |
| W3 Knowledge of the algorithms used in distinct phases of VLSI design | | | | | | |
| The student skills: | | | | | | |
| U1 Ability to design simple digital cuircits | | | | | | |
| U2 Ability to use algothrmic techniques in the phases of VLSI design. | | | | | | |
| The student's social competence: | | | | | | |
| K1 Understanding of the significance of the progress in the other research areas, such as physics and electronics, on the algorithmic aspects of VLSI design. | | | | | | |

| | | |
|-----------------------|--|--|
| COURSE CONTENT | | |
|-----------------------|--|--|

| | | |
|-----------------------------------|--|--|
| Type of classes - lectures | | |
|-----------------------------------|--|--|

| | | |
|-----|--------------------------------------------|----|
| Wy1 | Introduction to VLSI | 4h |
| Wy2 | Combinational and sequential digital logic | 4h |
| Wy3 | Layout styles of VLSI design | 2h |
| Wy4 | Circuit partitioning | 4h |
| Wy5 | Floorplaning | 4h |
| Wy6 | Placement | 4h |
| Wy7 | Routing | 6h |
| Wy8 | Layout generation | 2h |

| | | |
|------------------------------------|--|--|
| Type of classes - exercises | | |
|------------------------------------|--|--|

| | | |
|-----|----------------------------|----|
| Ćw1 | Digital circuits design | 6h |
| Ćw2 | Layout design | 6h |
| Ćw3 | Partitioning and placement | 6h |
| Ćw4 | Floorplanning | 6h |
| Ćw5 | Routing | 6h |

| | | |
|-------------------------------|--|--|
| Applied learning tools | | |
|-------------------------------|--|--|

- | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Multimedia lecture 2. Solving tasks and problems 3. Creating multimedia presentations by students 4. Self-study students |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|------------------------------------------------------------|--|--|
| EVALUATION OF THE EFFECTS OF EDUCATION ACHIEVEMENTS | | |
|------------------------------------------------------------|--|--|

| Value | Number of training effect | Way to evaluate the effect of education |
|-------|---------------------------|----------------------------------------------------------|
| F1 | W1-W3, K1-K1 | Final test |
| F2 | U1-U2, K1-K1 | Quality of student's presentations during the exercises. |

| |
|---------------------|
| $P=70\%*F1+30\%*F2$ |
|---------------------|

| | | |
|-------------------------------------|--|--|
| BASIC AND ADDITIONAL READING | | |
|-------------------------------------|--|--|

- | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Sadiq M Sait, Habib Youssef, VLSI PHYSICAL DESIGN AUTOMATION Theory and Practice, World Scientific 2. Sabih H. Gerez, Algorithms for VLSI Design Automation, John Wiley and Sons, Chichester. 3. Wayne Wolf, Modern VLSI Design: IP-Based Design (Prentice Hall Modern Semiconductor Design) 4. http://ismwww.epfl.ch/Education/former/2002-2003/VLSIDesign/index.html 5. http://6004.csail.mit.edu/6.371/ 6. http://scale.engin.brown.edu/classes/EN1600S08/ 7. http://www3.hmc.edu/harris/cmosvlsi/4e/index.html |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| |
|----------------------|
| SUPERVISOR OF COURSE |
|----------------------|

| |
|---------------|
| dr Marcin Kik |
|---------------|

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE
VLSI Systems

WITH EFFECTS OF EDUCATION ON THE DIRECTION OF COMPUTER SCIENCE

| Course training effect | Reference to the effect of the learning outcomes defined for the field of study and specialization (if applicable) | Objectives of the course** | The contents of the course** | Number of teaching tools** |
|------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|----------------------------|
| W1 | K2_W01 K2_W05 K2_W06 K2_W07 | C1 | Wy1-Wy8 | 1 4 |
| W2 | K2_W01 K2_W04 K2_W05 K2_W07 | C1 | Wy1-Wy8 | 1 4 |
| W3 | K2_W01 K2_W02 K2_W03 K2_W04 K2_W05 | C1 | Wy1-Wy8 | 1 4 |
| U1 | K2_U01 K2_U02 | C2 | Ćw1-Ćw5 | 2 3 4 |
| U2 | K2_U01 K2_U02 K2_U03 K2_U04 K2_U10 K2_U14 K2_U15 K2_U21 | C2 | Ćw1-Ćw5 | 2 3 4 |
| K1 | K2_K01 | C1 C2 | Wy1-Wy8 Ćw1-Ćw5 | 1 2 3 4 |