KIERUNEK INŻYNIERIA BIOMEDYCZNA, STUDIA I STOPNIA (INŻYNIERSKIE)
ŚCIEŻKA DYPLOMOWANIA: ELEKTRONIKA I APARATURA MEDYCZNA

| | | Godziny | | | | | | I | | | | | | | II | | | | | | | III | | | | | | | IV | | | | | | | V | | | | | | | VI | | | | | | | VII | | | | | |
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| | **Przedmioty wspólne** | **Suma** | **W** | **C** | **L** | **P** | **S** | **W** | **C** | **L** | **P** | **S** | **E** | **ECTS** | **W** | **C** | **L** | **P** | **S** | **E** | **ECTS** | **W** | **C** | **L** | **P** | **S** | **E** | **ECTS** | **W** | **C** | **L** | **P** | **S** | **E** | **ECTS** | **W** | **C** | **L** | **P** | **S** | **E** | **ECTS** | **W** | **C** | **L** | **P** | **S** | **E** | **ECTS** | **W** | **C** | **L** | **P** | **S** | **ECTS** |
| 1 | WF | **60** | | **60** | | | | | 30 | | | | | | | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Język obcy | **120** | | **120** | | | | | 30 | | | | | 2 | | 30 | | | | | 2 | | 30 | | | | E | 2 | | 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Techniki i narzędzia komunikacji | **30** | **15** | **15** | | | | 15 | 15 | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Wprowadzenie do przedsiębiorczości | **30** | **30** | | | | | | | | | | | | 30 | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Ochrona własności intelektualnej | **15** | **15** | | | | | | | | | | | | | | | | | | | 15 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Matematyka dla inżynierów | **30** | | **30** | | | | | 30 | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Matematyka | **90** | **30** | **60** | | | | | | | | | | | 30 | 60 | | | | E | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Matematyka kierunkowa | **60** | **30** | **30** | | | | | | | | | | | | | | | | | | 30 | 30 | | | | E | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Informatyka i podstawy programowania | **30** | **10** | | **20** | | | 10 | | 20 | | | E | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Grafika inżynierska | **30** | | | **30** | | | | | 30 | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Podstawy inżynierii biomedycznej moduł I | **60** | **20** | | **40** | | | 20 | | 40 | | | E | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Podstawy inżynierii biomedycznej moduł II | **45** | **15** | | **30** | | | 15 | | 30 | | | E | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | Fizyka | **75** | **15** | **60** | | | | | | | | | | | | 30 | | | | | 3 | 15 | 30 | | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Fizyka kierunkowa | **30** | **15** | | **15** | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | | | | 3 | | | | | | | | | | | | | | | | | |
| 15 | Chemia | **25** | **10** | | **15** | | | 10 | | 15 | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Podstawy anatomii i fizjologii | **20** | **20** | | | | | | | | | | | | | | | | | | | 20 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Dane biomedyczne | **60** | | | **60** | | | | | | | | | | | | 60 | | | E | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Technologie inżynierskie w medycynie i sporcie | **60** | **30** | | **30** | | | | | | | | | | 30 | | 30 | | | E | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Wprowadzenie do pracy problemowej (PBL) | **45** | | | | **45** | | | | | | | | | | | | 45 | | | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | UBZO | **150** | **150** | | | | | | | | | | | | 30 | | | | | | 2 | 30 | | | | | | 2 | 30 | | | | | | 2 | 30 | | | | | | 2 | 30 | | | | | | 2 | | | | | | |
| 21 | Praktyka studencka | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | Projekt inżynierski | **45** | | | | **45** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Ścieżka dyplomowania: ELEKTRONIKA I APARATURA MEDYCZNA** | **1110** | **405** | **375** | **240** | **90** | | **70** | **105** | **135** | | | | **28** | **120** | **150** | **90** | **45** | | | **32** | **110** | **90** | | | | | **14** | **45** | **30** | **15** | | | | **7** | **30** | | | | | | **2** | **30** | | | | | | **6** | | | | **45** | | **15** |
| **M1** | **Informatyka** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Programowanie systemów komputerowych | **60** | **30** | | **30** | | | | | | | | | | | | | | | | | 30 | | 30 | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Algorytmy i struktury danych | **30** | **15** | | **15** | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | | | | 2 | | | | | | | | | | | | | | | | | |
| 3 | Metody numeryczne | **60** | **30** | | **30** | | | | | | | | | | | | | | | | | | | | | | | | 30 | | 30 | | | E | 5 | | | | | | | | | | | | | | | | | |
| 5 | Bazy danych i archiwizacja danych medycznych | **45** | **15** | | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 30 | | | | 3 | | | | | | | | | | | |
| 6 | Sieci komputerowe i transmisja danych medycznych | **60** | **15** | | **30** | **15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 30 | 15 | | | 4 | | | | | | |
| 7 | Programowanie w środowisku graficznym | **45** | **15** | | **15** | **15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | 15 | | 3 |
| **M2** | **Przetwarzanie danych medycznych** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Statystyka w analizie danych | **30** | **15** | | **15** | | | | | | | | | | | | | | | | | 15 | | 15 | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Rejestracja sygnałów biomedycznyych | **30** | | | | **30** | | | | | | | | | | | | | | | | | | | 30 | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Techniki obrazowania medycznego | **60** | **30** | | **15** | **15** | | | | | | | | | | | | | | | | 30 | | 15 | 15 | | E | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Cyfrowe przetwarzanie sygnałów biomedycznych | **60** | | | **30** | | **30** | | | | | | | | | | | | | | | | | | | | | | | | 30 | | 30 | E | 5 | | | | | | | | | | | | | | | | | |
| 12 | Analiza obrazów medycznych | **90** | **15** | | **30** | **45** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 30 | 15 | | E | 5 | | | | 30 | | | 2 | | | | | |
| 13 | Podstawy eksploracji danych | **75** | **15** | | **30** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 30 | | | | 3 | | | | 30 | | | 2 | | | | | |
| **M3** | **Sztuczna inteligencja i modelowanie systemów biologicznych** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Podstawy sztucznej inteligencji | **30** | **15** | | **15** | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | | | | 2 | | | | | | | | | | | | | | | | | |
| 15 | Modelowanie systemów biologicznych | **45** | | | **30** | **15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | 15 | | 2 |
| 16 | Uczenie maszynowe | **60** | **15** | | **15** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | 30 | | E | 5 | | | | | | | | | | |
| 17 | Uczenie głębokie | **60** | **15** | | **15** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | 30 | | E | 5 | | | | | | |
| 18 | Analiza danych wielomodalnych | **60** | **15** | | **15** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 15 | 30 | | E | 5 | | | | | | |
| 19 | Systemy autonomiczne | **60** | | | | **30** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | 30 | 3 |
| **M4** | **Elektronika, sensory, metrologia i aparatura medyczna** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Teoria obwodów | **30** | **15** | | **15** | | | | | | | | | | | | | | | | | 15 | | 15 | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Podstawy elektroniki | **45** | **30** | | **15** | | | | | | | | | | | | | | | | | | | | | | | | 30 | | 15 | | | | 3 | | | | | | | | | | | | | | | | | |
| 22 | Układy elektroniczne | **45** | **15** | | **30** | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 30 | | | | 4 | | | | | | | | | | | | | | | | | |
| 23 | Metrologia biomedyczna | **30** | | | | **15** | **15** | | | | | | | | | | | | | | | | | 15 | 15 | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Pomiary wielkości nieelektrycznych i sensory biomedyczne | **60** | | | **30** | | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | | 30 | | | | 3 | | | | | | | | | | | |
| 25 | Biosensory | **30** | | | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | | | 2 |
| 26 | Systemy wbudowane | **45** | **15** | | **30** | | | | | | | | | | | | | | | | | | | | | | | | 15 | | 30 | | | | 3 | | | | | | | | | | | | | | | | | |
| 27 | Biomedyczne systemy IoT | **45** | | | **30** | | **15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | | 15 | 3 |
| 28 | Aparatura medyczna | **45** | **30** | | | **15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | | | 15 | | | 3 | | | | | |
| 29 | Aparatura analityczna i laboratoryjna | **60** | | | | **30** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | 30 | | 3 | | | | | |
| 30 | Artifical organs | **30** | | | | **15** | **15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | 15 | 2 |
| 31 | Telematyka medyczna | **60** | | | | **30** | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | 30 | | 4 | | | | | |
| 32 | Badania przedkliniczne w inżynierii biomedycznej | **30** | | | | | **30** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 | | 2 | | | | | |
| | | **1515** | **360** | | **540** | **390** | **225** | | | | | | | | | | | | | | | **90** | | **75** | **60** | **15** | | **18** | **105** | | **135** | | **30** | | **21** | **75** | | **165** | **75** | **90** | | **28** | **75** | | **60** | **180** | **30** | | **24** | **15** | | **105** | **75** | **60** | **15** |
| | **Łącznie** | **2625** | **765** | **375** | **780** | **480** | **225** | **70** | **105** | **135** | | | | **28** | **120** | **150** | **90** | **45** | | | **32** | **200** | **90** | **75** | **60** | **15** | | **32** | **150** | **30** | **150** | | **30** | | **28** | **105** | | **165** | **75** | **90** | | **30** | **105** | | **60** | **180** | **30** | | **30** | **15** | | **105** | **120** | **60** | **30** |
| | | **Suma/Godziny tygodniowo** | | | | | | **310** | | | | | | **21** | **405** | | | | | | **27** | **440** | | | | | | **29** | **360** | | | | | | **24** | **435** | | | | | | **29** | **375** | | | | | | **25** | **300** | | | | | **20** |

**Plan studiów obowiązuje od roku akademickiego: 2026/2027**