



Subject card

|  |  |  |  |            |  |         |     |
|--|--|--|--|------------|--|---------|-----|
| Subject name and code                                    | Microwave Engineering, PG_00048081   |  |  |            |  |         |     |
| Field of study   | Electronics and Telecommunications   |  |  |            |  |         |     |
| Date of commencement of studies                          | October 2026   | Academic year of realisation of subject                  |  |            | 2028/2029  |         |     |
| Education level  | first-cycle studies  | Subject group  |  |            | Optional subject group<br>Subject group related to scientific research in the field of study |         |     |
| Mode of study  | Full-time studies  | Mode of delivery   |  |            | at the university  |         |     |
| Year of study  | 3  | Language of instruction                                  |  |            | Polish   |         |     |
| Semester of study  | 5  | ECTS credits   |  |            | 2.0  |         |     |
| Learning profile   | general academic profile   | Assessment form  |  |            | assessment   |         |     |
| Conducting unit  | Department of Microwave and Antenna Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology   |  |  |            |  |         |     |
| Name and surname of lecturer (lecturers)                 | Subject supervisor   | dr hab. inż. Rafał Lech                                  |  |            |  |         |     |
|  | Teachers   | dr hab. inż. Rafał Lech                                  |  |            |  |         |     |
| Lesson types   | Lesson type  | Lecture  | Tutorial   | Laboratory | Project  | Seminar | SUM |
|  | Number of study hours  | 15.0   | 0.0  | 15.0       | 0.0  | 0.0     | 30  |
|  | E-learning hours included: 0.0   |  |  |            |  |         |     |
| Learning activity and number of study hours              | Learning activity  | Participation in didactic classes included in study plan | Participation in consultation hours  | Self-study | SUM  |         |     |
|  | Number of study hours  | 30   | 2.0  | 18.0       | 50   |         |     |
| Subject objectives                                       | Student acquainted with the basic operation principles, parameters and design methods of the waveguides and microwave circuits The guides include waveguides and transmission lines with TEM wave. Procedures for microwave circuit design, including lumped elements circuits, microwavel dividers, couplers , phase shifters and non-reciprocal ferrite devices are determined on the base of their scattering matrix.   |  |  |            |  |         |     |
| Learning outcomes  | Course outcome   |  | Subject outcome  |            | Method of verification   |         |     |
| Subject contents   | <p>Course content – lecture</p> <p>1. Waveguides and resonators: rectangular, cylindrical, ridge the equiva-lent circuits, wave parameters, loop and electric probe fed guides and resonators 2. Strip and coaxial lines and resonators, multiconductor lines, the equiva-lent circuits, the higher TE and TM modes, connectors 3. Integrated lines and resonators; microstrip, slot line and coplanar tech-nology, the equivalent circuits and the parameters, surface waves and the higher order modes 4. The edge and broadside coupling striplines, microstrips slot lines, even and odd modes, their equivalent circuits and parameters 5. The impedance matching and tuning- single and double stub tuning. quarter wave transformers, realization technique, the parameters and design 6. Design of binomial and Chebyshev multisection matching transformers 7. Design principles of the inhomogeneous matching transformers 8. Discontinuites in waveguides, strip and microstrip lines and their equivalent circuits</p> |  |  |            |  |         |     |
| Prerequisites and co-requisites                          | No requirements  |  |  |            |  |         |     |
| Assessment methods and criteria                          | Subject passing criteria   |  | Passing threshold  |            | Percentage of the final grade  |         |     |
|  | Midterm colloquium   |  | 60.0%  |            | 60.0%  |         |     |
|  | Practical exercise   |  | 40.0%  |            | 40.0%  |         |     |
| Recommended reading                                      | Basic literature   |  | S. Rośliniec "Liniowe obwody mikrofalowe" WKŁ 1999 2. J. Mazur "Inzynieria mikrofalowa " lecture notes, mwave .eti.pg.gda.pl 3D.Pozar"Microwave engineering" j.Willey&Sons, 1998 |            |  |         |     |
|  | Supplementary literature   |  | No requirements  |            |  |         |     |
|  | eResources addresses   |  |  |            |  |         |     |
| Example issues/ example questions/ tasks being completed |  |  |  |            |  |         |     |
| Practical activites within the subject                   | Not applicable   |  |  |            |  |         |     |

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