



POWER DEVICES AND SYSTEMS LABORATORY

# Manual 0

## Introduction to Power Electronics

### Power Electronic Converter Circuits

### Power Semiconductor Devices

Indicatory work plan

| Week |  |  |  |  |  | After Class |
|------|--|--|--|--|--|-------------|
| 1–2  |  |  |  |  |  | 1–2         |
| 3–4  |  |  |  |  |  | 3–4         |

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## Course Introduction

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### 1. Electric Energy Transmission and Conversion

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#### 1.1. Recommended reading

| Ref. | Textbook | Excerpt                 | Equivalent in the Polish Manual | Complementary Reading | Complements in this Manual |
|------|----------|-------------------------|---------------------------------|-----------------------|----------------------------|
| A    | Eri      | 1.2, 1.3                | #0 1                            |                       |                            |
| B    | Eri      | 1.1                     | #0 2.1, 2.6.c                   |                       |                            |
| C    | Moh      | 3-2-1, 3-2-2            | #0 2.2, 4.1.d                   |                       |                            |
| D    | Moh      | 3-2-3, 3-2-3-1, 3-2-3-2 | #0 2.4, 2.6.d                   |                       |                            |



## 2. Electronic Power Converters

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### 2.1. Recommended reading

| Ref. | Textbook | Excerpt      | Equivalent in the Polish Manual | Complementary Reading | Complements in this Manual |
|------|----------|--------------|---------------------------------|-----------------------|----------------------------|
| E    | Ras      | 6.2          | #0 3.2                          |                       |                            |
| F    | Moh      | 1-4-1, 1-4-2 | #0 3.1                          |                       |                            |





### 3. The Semiconductor Switch

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#### 3.1. Recommended reading

| Ref. | Textbook | Excerpt                       | Equivalent in the Polish Manual | Complementary Reading | Complements in this Manual |
|------|----------|-------------------------------|---------------------------------|-----------------------|----------------------------|
| G    | Ras      | 6.3                           | #0 4.1.a–c, 4.2.a–c             |                       |                            |
| H    | Ben      | 3.1, 3.1.1–3.1.3, 3.1.5–3.1.8 | #0 4.3.a–b, 4.4, 4.5.e, 6.7     |                       |                            |



## 4. Semiconductor Junctions

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### 4.1. Recommended reading

| Ref. | Textbook | Excerpt           | Equivalent in the Polish Manual | Complementary Reading | Complements in this Manual |
|------|----------|-------------------|---------------------------------|-----------------------|----------------------------|
| I    | Ben      | 1.1, 1.2, 1.3.1   | #0 6.1, 6.2.a                   |                       |                            |
| J    | Ben      | 1.4.1, 1.4.2, 1.5 | #0 6.4                          |                       |                            |
| K    | Ben      | 2.1, 2.1.1        | #0 6.2.b–d                      |                       |                            |
| L    | Ben      | 2.1.2, 2.1.3      | #0 5.1, 5.2                     |                       |                            |
| M    | Ben      | 2.2               | #0 6.3.c–d                      |                       |                            |
| N    | Ben      | 2.4, 2.4.1, 2.4.2 | #0 5.4.bd, 6.3.a–b              |                       |                            |



## 5. References

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- [1] Benda V., Gowar J., Grant D. A.: *Power Semiconductor Devices: Theory and Applications*. Wiley, 1999. ISBN 0-471-97644-X.
- [2] Mohan N., Undeland T. M., Robbins W. P.: *Power Electronics: Converters, Applications, and Design*. 3rd Ed. Wiley, 2003. ISBN 0-471-22693-9.
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- [4] Rashid M. H. (ed.): *Power Electronics Handbook*. Academic Press, 2001. ISBN 0-12-581650-2.