

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Record Nr.           | UNINA9910784446403321                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Autore                  | Onwubolu Godfrey C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Titolo                  | Mechatronics [[electronic resource] ] : principles and applications / / Godfrey C. Onwubolu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Pubbl/distr/stampa      | Oxford [England] ; ; Burlington, MA, : Elsevier Butterworth-Heinemann, c2005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ISBN                    | 1-281-00634-3<br>9786611006341<br>0-08-049290-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Descrizione fisica      | 1 online resource (668 p.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Disciplina              | 621<br>621 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Soggetti                | Mechatronics<br>Mechanical engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Lingua di pubblicazione | Inglese                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Formato                 | Materiale a stampa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Livello bibliografico   | Monografia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Note generali           | Description based upon print version of record.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Nota di bibliografia    | Includes bibliographical references and index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Nota di contenuto       | Mechatronics; Principles and Applications; Mechatronics; Principles and Applications; Contents; Preface; Acknowledgments; Chapter 1: Introduction to mechatronics; 1.1 Historical perspective; 1.2 Key elements of a mechatronic system; 1.3 Some examples of mechatronic systems; Further reading; Problems; Chapter 2: Electrical components and circuits; 2.1 Introduction; 2.2 Electrical components; 2.3 Resistive circuits; 2.4 Sinusoidal sources and complex impedance; Problems; Further reading; Chapter 3: Semiconductor electronic devices; 3.1 Introduction; 3.2 Covalent bonds and doping materials<br>3.3 The p-n junction and the diode effect 3.4 The Zener diode; 3.5 Power supplies; 3.6 Active components; Problems; Further reading; Chapter 4: Digital electronics; 4.1 Introduction; 4.2 Number systems; 4.3 Combinational logic design using truth tables; 4.4 Karnaugh maps and logic design; 4.5 Combinational logic modules; 4.6 Timing diagrams; 4.7 Sequential logic components; 4.8 Sequential logic design; 4.9 Applications of flip-flops; Problems; Further reading; Chapter 5: Analog electronics; 5.1 Introduction; 5.2 Amplifiers; 5.3 The ideal operational amplifier model; 5.4 The inverting amplifier |

5.5 The non-inverting amplifier 5.6 The unity-gain buffer; 5.7 The summing amplifier; 5.8 The difference amplifier; 5.9 The instrumentation amplifier; 5.10 The integrator amplifier; 5.11 The differentiator amplifier; 5.12 The comparator; 5.13 The sample and hold amplifier; 5.14 Active filters; Problems; Further reading; Chapter 6: Microcomputers and microcontrollers; 6.1 Introduction; 6.2 Microcontrollers; 6.3 The PIC16F84 microcontroller; 6.4 Programming a PIC using assembly language; 6.5 Programming a PIC using C; 6.6 Interfacing common PIC peripherals: the PIC millennium board 6.7 The PIC16F877 microcontroller 6.8 Interfacing to the PIC; 6.9 Communicating with the PIC during programming; Problems; Further reading; Chapter 7: Data acquisition; 7.1 Introduction; 7.2 Sampling and aliasing; 7.3 Quantization theory; 7.4 Digital-to-analog conversion hardware; 7.5 Analog-to-digital conversion hardware; Problems; Further reading; Chapter 8: Sensors; 8.1 Introduction; 8.2 Distance sensors; 8.3 Movement sensors; 8.4 Proximity sensors; 8.5 Electrical strain and stress measurement; 8.6 Force measurement; 8.7 Time of flight sensors; 8.8 Binary force sensors 8.9 Temperature measurement 8.10 Pressure measurement; Problems; Further reading; Internet resources; Chapter 9: Electrical actuator systems; 9.1 Introduction; 9.2 Moving-iron transducers; 9.3 Solenoids; 9.4 Relays; 9.5 Electric motors; 9.6 Direct current motors; 9.7 Dynamic model and control of d.c. motors; 9.8 The servo motor; 9.9 The stepper motor; 9.10 Motor selection; Problems; Further reading; Internet resources; Chapter 10: Mechanical actuator systems; 10.1 Hydraulic and pneumatic systems; 10.2 Mechanical elements; 10.3 Kinematic chains; 10.4 Cam mechanisms; 10.5 Gears 10.6 Ratchet mechanisms

---

## Sommario/riassunto

Mechatronics is a core subject for engineers, combining elements of mechanical and electronic engineering into the development of computer-controlled mechanical devices such as DVD players or anti-lock braking systems. This book is the most comprehensive text available for both mechanical and electrical engineering students and will enable them to engage fully with all stages of mechatronic system design. It offers broader and more integrated coverage than other books in the field with practical examples, case studies and exercises throughout and an Instructor's Manual. A further key feature

---