Contents :

6. Laser Drilling

- Percussion drilling
- Trepanning methods
- Microdrilling
- Drilling efficiency
- Hole quality evaluation

7. Laser Welding

- Fundamentals of laser welding
- Conduction welding
- Keyhole welding
- Weld defects and quality
- Hybrid laser welding systems

8. Laser Surface Engineering

- Surface hardening
- Surface melting
- Surface alloying
- Surface cladding
- Surface texturing

9. Laser Heat Treatment

- Transformation hardening
- Annealing processes
- Residual stress effects
- Metallurgical transformations

10. Laser Micromachining

- Precision machining
- Thin-film processing
- Semiconductor applications
- MEMS fabrication
- Electronics manufacturing

11. Laser Processing of Metals

- Steel processing
- Aluminum alloys
- Titanium alloys
- Nickel-based alloys

- Metallurgical effects

12. Laser Processing of Nonmetals

- Ceramics
- Polymers
- Glass
- Composite materials

13. Laser Cladding and Rapid Manufacturing

- Cladding systems
- Repair and coating applications
- Rapid prototyping
- Additive manufacturing concepts

14. Process Monitoring and Control

- Sensors and diagnostics
- Real-time monitoring
- Quality assurance
- Automation and robotics

15. Safety in Laser Processing

- Laser hazards
- Safety standards
- Protective systems
- Industrial safety procedures

16. Industrial Applications

- Automotive industry
- Aerospace engineering
- Biomedical applications
- Electronics industry
- Tool manufacturing

17. Future Developments

- Ultrafast lasers
- Nanotechnology applications
- Advanced manufacturing systems
- Future industrial trends

Appendices

- Material properties
- Laser equations and parameters
- Standards and references
- Glossary of terms

Bibliography

Index