

# Program Summary by Theme

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## **01: Biomedical Signal Processing**

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- 01.01: Time-frequency and time-scale analysis
- 01.02: Signal processing and physiological system modeling
- 01.03: Nonlinear dynamic analysis of biological signals
- 01.04: Signal pattern classification
- 01.05: Principal component analysis and independent component analysis
- 01.06: Adaptive and parametric filtering

## **02: Biomedical Imaging and Image Processing**

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- 02.01: Magnetic resonance imaging
- 02.02: Ultrasound imaging
- 02.03: Optical and infra-red imaging
- 02.04: Electrical source and impedance imaging
- 02.05: X-Ray and CT imaging
- 02.06: Molecular imaging
- 02.07: Neuroimaging
- 02.08: Cardiac imaging
- 02.09: Biological imaging
- 02.10: Biomedical image reconstruction
- 02.11: Biomedical image segmentation and analysis

## **03: Bioinstrumentation; Sensors; Micro, Nano and Wearable Technologies**

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- 03.01: Enabling technologies and integrated systems for diagnosis and therapy
- 03.02: New transducer methods and technologies
- 03.03: Biological and biochemical sensors: analytical technologies and systems
- 03.04: Implantable and other in-body miniaturised systems and devices
- 03.05: Wireless non-implantable and telemetry systems
- 03.06: Monitoring systems
- 03.07: Wearable systems
- 03.08: Wearable textile sensors, smart fabrics and flexible systems
- 03.09: Wearable integrated systems and sensors for e-health, p-health and m-health

## **04: Bioinformatics and Computational Biology; Systems Biology; Modeling Methodologies**

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- 04.01: Modeling of biological systems
- 04.02: Computational genomics and proteomics
- 04.03: Novel technologies for computational biology and bioinformatics
- 04.04: Gene expression, gene networks and microarray analysis
- 04.05: Structural and functional bioinformatics

## **05: Cardiovascular and Respiratory Systems Engineering**

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- 05.01: Cardiac electrophysiology
- 05.02: Cardiovascular mechanics and hemodynamics
- 05.03: Cardiovascular models and ventricular assist devices
- 05.04: Sleep disorders
- 05.05: Heart rate and blood pressure variability
- 05.06: Respiratory systems

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**06: Neural Engineering; Neuromuscular Systems; Rehabilitation Engineering**

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- 06.01: Neural nano/microsystems
- 06.02: Neural sensing and signal processing
- 06.03: Neural stimulation and FES
- 06.04: Auditory and visual neuroprostheses
- 06.05: EEG and EP - sleep, pain and other modalities
- 06.06: Brain-computer interfaces
- 06.07: Neuromodulation by electrical stimulation of the central nervous system
- 06.08: Rehabilitation robotics
- 06.09: Muscle and EMG
- 06.10: Sensory motor systems: central and peripheral mechanisms
- 06.11: Posture and locomotion

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**07: Molecular and Cellular Biomechanics; Tissue Engineering; Biomaterials**

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- 07.01: Molecular and cellular biomechanics
- 07.02: Cellular and tissue engineering
- 07.03: Biomaterials and cell-biomaterial interactions

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**08: Bio-robotics; Surgical Planning and Orthopedic Biomechanics**

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- 08.01: Surgical Robotics and Computer-Assisted Surgery
- 08.02: Human-Robot Interactions and Bio-robotics
- 08.03: Orthopedic and Musculoskeletal Biomechanics

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**09: Therapeutic and Diagnostic Systems, Devices and Technologies; Clinical Engineering**

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- 09.01: Therapeutic devices with applications in clinics
- 09.02: Image-guided therapy
- 09.03: Clinical engineering

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**10: Healthcare Information Systems; Telemedicine**

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- 10.01: Healthcare information systems
- 10.02: Personal health systems
- 10.03: Telemedicine and related applications
- 10.04: Decision support systems
- 10.05: Ambient assisted living solutions
- 10.06: Health systems engineering

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**11: Technology Commercialisation; Education, Industry and Society**

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- 11.01: Approaches in education for engineering in medicine and biology
- 11.02: Biomedical Engineering Industry, Commercialization and Innovation
- 11.03: Societal Aspects of Biomedical Engineering

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**12: Student Activities and the Biomedical Engineering Profession**

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- 12.01: Student Activities
- 12.02: Biomedical Engineering Profession