ITS
Institut
Teknologi
Sepuluh Nopember

DEPARTMENT OF **BIOMEDICAL ENGINEERING**

Institute Technology of Sepuluh Nopember (ITS)

DAFTAR ISI
TABLE OF CONTENT

Prakata 1
Foreword 1

Tentang Departemen Teknik Biomedik 3
About Department of Biomedical Engineering *3*

Visi Dan Misi 6
Vision And Mission *6*

Budaya Kerja dan Pengajaran 7
Work and Teaching Culture *7*

Kompetensi 7
Competence 7

Kompetensi Tenaga Ahli 9
Expert Competence 9

Prestasi Mahasiswa 11
Students Achievement 11

Riset & Pengembangan Saat Ini 13
Current Research & Development *13*

Riset Di Masa Mendatang 13
Forthcoming Development *13*

Fasilitas 15
Facility *15*

Kemitraan 17
Partnership *17*

Prakata

Sebagai kota metropolitan terbesar kedua setelah Jakarta, Surabaya memiliki andil yang besar dalam menopang pembangunan perekonomian serta menjadi pusat bisnis, perdagangan, industri, dan merupakan barometer pendidikan di kawasan Indonesia timur.

Institut Teknologi Sepuluh Nopember (ITS), merupakan Perguruan Tinggi negeri ternama di wilayah Indonesia Timur.

Foreword

As the second largest metropolitan city after Jakarta, Surabaya has a large share in sustaining the economic development as well as being a center of business, trade, industry, and also as an educational barometer in eastern Indonesia area.

Institute Technology of Sepuluh Nopember (ITS), is a prominent state university in eastern Indonesia. Located in Surabaya, East Java, Indonesia, ITS has 10 faculties with 37

INDONESIA

Berlokasi di Surabaya, propinsi Jawa Timur, Indonesia, ITS memiliki 10 fakultas dengan 37 departemen yang menempati area seluas 187 Ha di kampus utama Sukolilo, Kampus Manyar dan Kampus Hos Cokroaminoto. Departemen Teknik Biomedik, berdiri secara resmi sejak tahun 2015 dibawah naungan Fakultas Teknologi Elektro Menempati 3 gedung utama yaitu AJ, B, dan C.

departments occupying an area of 187 Ha in main campus Sukolilo, Manyar Campus and Hos Cokroaminoto Campus. Department of Biomedical Engineering, has officially been established since 2015 under the auspices of the Faculty of Electrical Technology. It occupies 3 main buildings of the Faculty of Electrical Technology, in building of AJ, B, and C.

Tentang Departemen Teknik Biomedik

Departemen Teknik Biomedik ITS dibentuk dengan visi dan misi untuk mencetak generasi penerus yang memiliki kemampuan analisa dan sintesa yang kuat dalam bidang spesialisasi Instrumentasi Biomedik, Pengolahan Sinyal Biomedik, Biomekanika, Kontrol Biomedik, Biomaterial, dan lain-lain.

Dengan kemampuan tersebut, diharapkan setiap lulusan akan mampu untuk memenuhi tantangan dunia kerja di bidang disain peralatan medis, pengolahan sinyal dan citra medis, teknik klinis, rehabilitasi medis, serta teknologi bantuan untuk individu yang berkebutuhan khusus.

Kegiatan penelitian pada Departemen ini memusatkan perhatian pada mekanisme komputasi, komunikasi dan sistem kontrol pada sistem biologis, dan aplikasinya pada bidang biologi, elektronik dan mekanika.

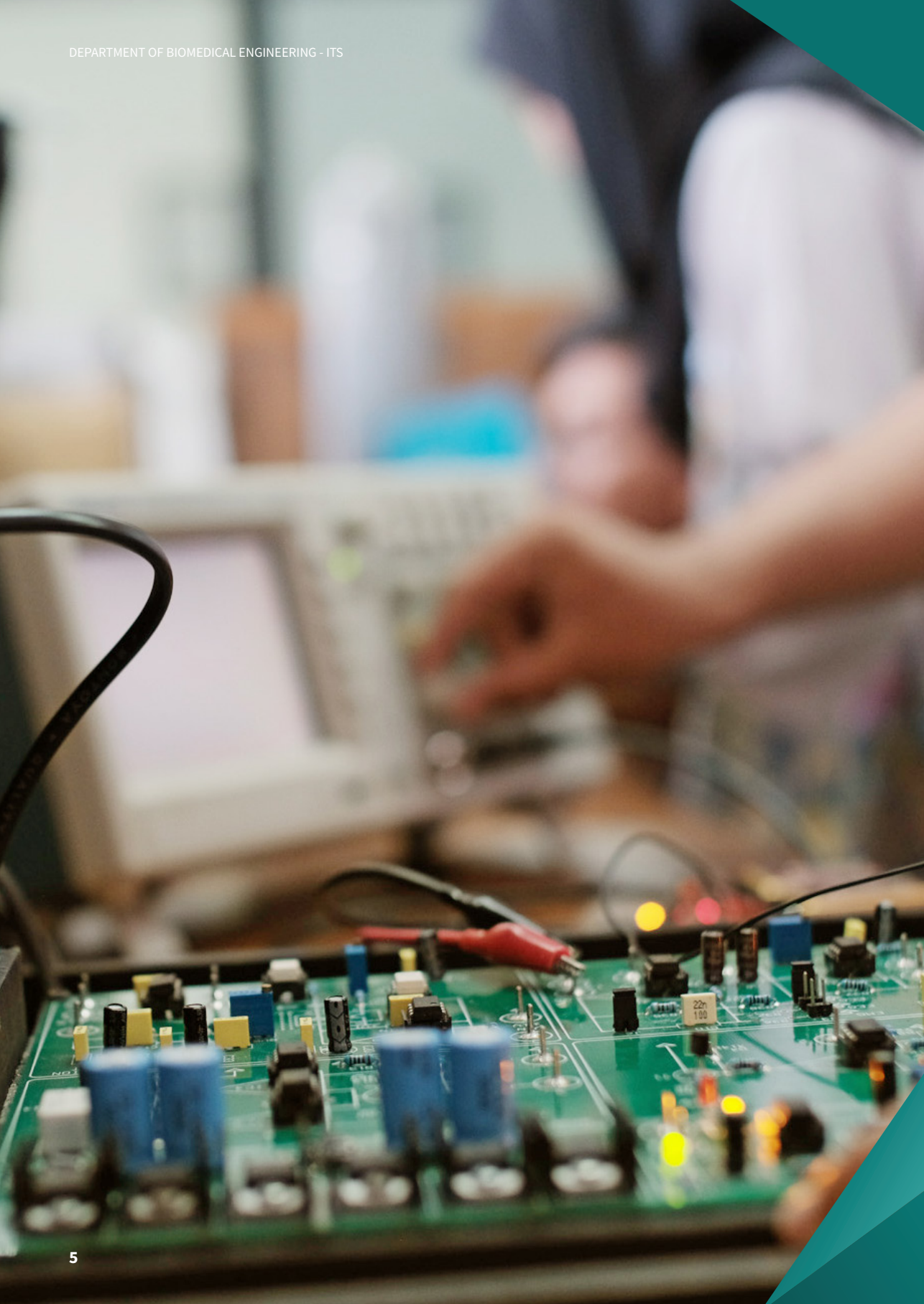
About Department of Biomedical Engineering

Biomedical Engineering program in ITS aims to create the future generations of engineers and scientists with strong analytic and synthetic capability in the fields of Biomedical Instrumentation, Biomedical Signal Processing, Biomechanics, Biomedical Control, Biomaterial, and etc.

With those capabilities, the graduates of this program is expected to be able to face research, industrial, and academical challenges in the design of medical instruments, medical signal and image processing, clinical engineering, medical rehabilitation, and assistive technology for individual with special needs.

Our research focuses on computation, communication, and control process mechanism in biological systems and its application in biological, electronics, and mechanical systems.

MEDICAL
IMAGING



VISI

Unggul dan berkelas dunia dalam pendidikan dan penelitian Teknik Biomedik

VISION

To be a world class institution in Biomedical Engineering education and research.

MISI

a. Berperan aktif dalam memajukan ilmu pengetahuan dan teknologi melalui proses pendidikan, penelitian, dan pengabdian masyarakat terkait bidang ilmu teknik biomedik secara khusus dan rumpun besar ilmu teknik, secara terarah, terencana, dan berkesinambungan.
b. Menghasilkan lulusan yang menjadi sumber daya manusia yang memiliki kemampuan analisis dan kompetensi di bidang Teknik Biomedik dengan karakter profesional, bermoral, mempunyai daya saing tinggi dan mampu mengembangkan, meningkatkan, serta menerapkan IPTEK bagi kepentingan masyarakat luas
c. Menghasilkan publikasi ilmiah pada level nasional dan internasional

MISSION

a. Actively contribute in advancing science and technology through meticulous and sustainable programs of education, research, and community service in field of Biomedical Engineering in particular, and engineering in general.
b. Preparing human resources who have analytical skills and biomedical engineering competence with professionalism, morality, and highly competitiveness characteristics, and capable to develop, improve, and apply the science and technology which is beneficial for society.
c. Produce scientific publications in national and international level.

Tujuan Pendidikan

a. Untuk menghasilkan lulusan sarjana yang memiliki kompetensi Teknik Biomedik secara khusus, dan IPTEK secara umum, serta memiliki daya saing di pasar kerja nasional maupun internasional.

b. Untuk meningkatkan kontribusi program studi dalam hal sumber daya manusia terkait pengetahuan dan pemahaman, analisis, desain, praktek dan pengembangan produk, dan keterampilan yang dapat disalurkan pada bidang Teknik Biomedik.

c. Untuk menghasilkan karya ilmiah bereputasi dalam skala nasional dan internasional yang bermanfaat bagi kepentingan kemanusiaan.

Program Educational Objectives

a. To produces graduates, bachelor engineer who have specific competence in Biomedical Engineering, and general competence in Science and Technology, and have high competitiveness in national and global human resources market.

b. To promote contribution of study program human resources in knowledge and understanding, engineering analysis, engineering design, engineering practice and product development, and trasferable skills in Biomedical Engineering disciplines.

c. To produce reputable scientific publicataions which are beneficial for humanity on national and international levels.

Capaian Pembelajaran Lulusan

CPL-01 Mampu menerapkan Ilmu Pengetahuan Alam dan Matematika pada bidang Teknik Biomedika

CPL-02 Mampu menemukan, memahami, menjelaskan, merumuskan, dan menyelesaikan permasalahan umum pada bidang Teknik dan permasalahan khusus pada bidang Teknik Biomedika yang meliputi instrumentasi biomedika cerdas, teknik rehabilitasi medika, pencitraan dan pengolahan citra medika, serta informatika medika

CPL-03 Mampu merancang dan melaksanakan eksperimen laboratorium dan/atau lapangan, menganalisa dan menginterpretasi data, serta menggunakan penilaian yang obyektif untuk menarik kesimpulan

CPL-04 Mampu berkomunikasi secara efektif baik lisan maupun tulisan

CPL-05 Mampu mendesain komponen, sistem, dan proses dalam bidang Teknik Biomedika yang sistematis, logis, dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi dengan mengenali/ memanfaatkan sumber daya lokal dan nasional dengan wawasan global

Program Learning Outcomes

PLO-01 Able to apply Natural Sciences and Mathematics in the field of Biomedical Engineering

PLO-02 Able to find, understand, explain, formulate, and solve general problems in the field of Engineering and special problems in the field of Biomedical Engineering which includes intelligent biomedical instrumentation, medical rehabilitation techniques, imaging and processing of medical images, and medical informatics

PLO-03 Able to design and implement laboratory experiment and / or field experiments, analyze and interpret data, and use objective assessments to draw conclusions

PLO-04 Have good skills in oral and writing communications

PLO-05 Able to design components, systems, and processes in the field of Biomedical Engineering that are systematic, logical, and realistic appropriate with specified specifications by considering aspects of safety, social, cultural, environmental, and economic by recognizing / utilizing local and national resources with global insight

Capaian Pembelajaran Lulusan

CPL-06 Mampu menerapkan ilmu pengetahuan, keterampilan, dan metode terkini dalam menyelesaikan permasalahan di bidang Teknik Biomedika

CPL-07 Mampu merencanakan, menyelesaikan, dan mengevaluasi tugas di dalam batasan-batasan yang ada

CPL-08 Mampu bekerja dalam tim lintas disiplin dan budaya serta bertanggung jawab kepada masyarakat dan mematuhi hukum dan etika profesi dalam menyelesaikan masalah Teknik Biomedika

CPL-09 Mampu mengetahui/mengikuti perkembangan terkini dibidang ilmu pengetahuan dan teknologi serta menyikapinya secara obyektif dengan mengedepankan nilai-nilai kebenaran universal

CPL-10 Mampu menerapkan prinsip-prinsip teknologi dan kemampuan manajerial untuk dapat berkarya di bidang Teknik Biomedika maupun dalam kehidupan bersama di masyarakat pada tingkat nasional dan internasional

CPL-11 Mampu memahami kebutuhan akan pembelajaran sepanjang hayat

CPL-12 Mampu bersikap dan berperilaku religius, nasionalis, saling menghormati, mandiri, dan gigih

Program Learning Outcomes

PLO-06 Able to apply the latest knowledge, skills and methods in solving problems in the field of Biomedical Engineering

PLO-07 Able to plan, complete, and evaluate tasks within existing boundaries

PLO-08 Able to work in interdisciplinary and intercultural teams and be responsible to the community and comply with legal and professional ethics in solving Biomedical Engineering problems

PLO-09 Able to know / follow the latest developments in the field of science and technology and to react objectively by promoting the values of universal truth

PLO-10 Able to apply the principles of technology and managerial ability to be able to work in the field of Biomedical Engineering as well as in community life in the national and international level

PLO-11 Able to understand the need for lifelong learning

PLO-12 Able to behave and act religiously, nationally, respectfully, independently, and persistently

BUDAYA KERJA & PENGAJARAN

Departemen Teknik Biomedik menumbuhkan budaya apresiatif dan kolaborasi. Metode pengajaran menerapkan pendekatan *Integrative Educative Approach* yang tersusun atas tiga pilar, yaitu

- Intellectual Curiosity Exploration (minat intelektual, pengetahuan)
- Leadership and Technopreneurship (kepemimpinan, kemampuan organisasi dan bisnis)
- Character development (sikap, mental)

WORK AND TEACHING CULTURE

Department of Biomedical Engineering cultivate appreciation and collaboration culture. The teaching method utilized in the department is Integrative Educative Approach, containing the following points :

- *Intellectual Curiosity Exploration (intellectual interest, knowledge)*
- *Leadership and Technopreneurship (leadership, organizational and business skills)*
- *Character development (attitude, mental)*

KOMPETENSI

Departemen Teknik Biomedik pada Strata S1 di Perguruan Tinggi Negeri Institut Teknologi Sepuluh Nopember, telah memperoleh Akreditasi A berdasarkan No. SK 2281/SK/BAN-PT/Akred/S/VII/2017

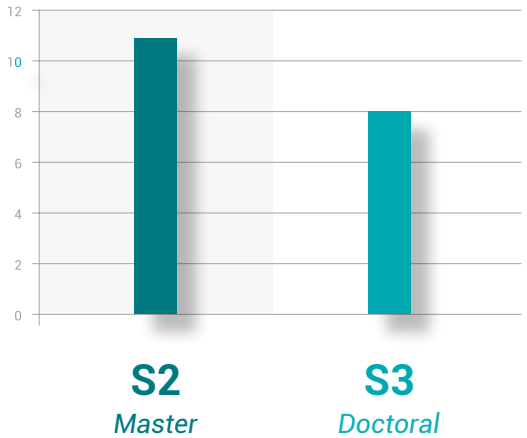
COMPETENCE

Biomedical Engineering Department at Institute Technology of Sepuluh Nopember (ITS) has obtained A rank Accreditation for its undergraduate program based on No. SK 2281 / SK / BAN-PT / Akred / S / VII / 2017

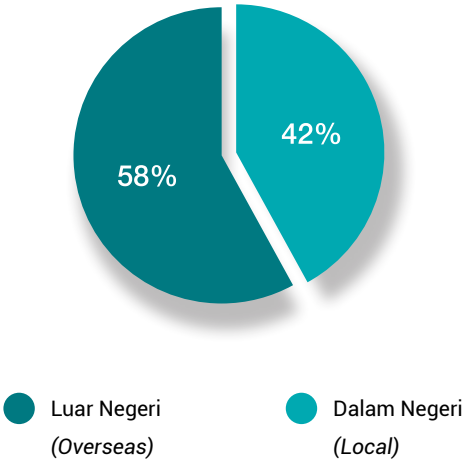
BAN-PT

KOMPETENSI TENAGA AHLI
EXPERT COMPETENCE

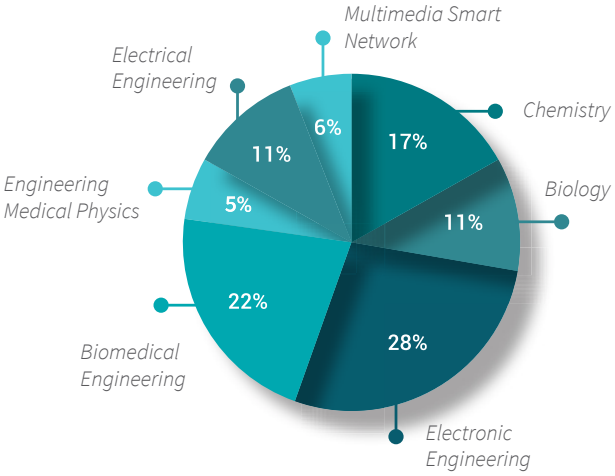
A. JENJANG PENDIDIKAN DOSEN TEKNIK BIOMEDIK
A. EDUCATION LEVEL OF BIOMEDICAL ENGINEERING TEACHING STAFF



B. ASAL LULUSAN PERGURUAN TINGGI
B. DEMOGRAPHIC OF TEACHING STAFFS' EDUCATION



C. BIDANG KEAHLIAN DOSEN
C. EXPERTISE OF TEACHING STAFF



PRESTASI MAHASISWA
STUDENT ACHIEVEMENT

No	Event and Time	Rank (Local, Regional, National, or International)	Achievement
1	ITS team member for robot contest 2014 (Haikal Maulana, Muhammad Fariz Zaini Fuad, Idil Fitrianto)	National	1st place national robot contest
2	ITS team member for robot contest 2014 (Haikal Maulana, Muhammad Fariz Zaini Fuad, Idil Fitrianto)	International (India)	Participant
3	ITS team member for tim robot contest 2013 (Haikal Maulana)	National	1st place national robot contest
4	ITS team member for tim robot contest 2013 (Haikal Maulana)	International (Hong Kong)	Participant
5	National Student Science Week 2013(Anindito Kusumojati)	National	Finalist
6	Indonesia ICT Award 2007 (Christian Perdana Adistana)	National	1st Place
7	Asia Pacific ICT Alliance Awards 2007 (Christian Perdana Adistana)	International	MERIT Award
8	National Electronic Invention Competition 2010 Biomedical Field (Eka Adi Prasetyo, Anindito Kusumojati)	National	General Winner (Wins the most in the competed categories)
9	National Electronic Invention Competition 2007 in Biomedical Field (Wahyu Exano Abdianto)	National	1st Place
10	National Electronics Competition 2007 Biomedical Field(Christian Perdana Adistana)	National	2nd Place
11	Business Plan Competition (BPC) Pekan Ekonomi National Sriwijaya Jilid II (Yeni Wahyu Siswanti)	National	5th Place
12	Electrical Business Plan (Yeni Wahyu Siswanti)	Regional	2nd Place

C3
T7
PO7

RISET & PENGEMBANGAN SAAT INI

- Instrumentasi Biomedik
- Pemrosesan Sinyal Tingkat Lanjut
- Teknik Rehabiltasi
- Teknologi Asistif dan Welfare
- Pemodelan, Simulasi, dan Kontrol

CURRENT RESEARCH & DEVELOPMENT

- *Biomedical Instrumentation*
- *Advanced Signal Processing*
- *Rehabilitation Engineering*
- *Assistive and Welfare Engineering*
- *Modeling, Simulation and Control*

RISET DI MASA MENDATANG

- Teknologi ***Virtual Reality*** untuk rehabilitasi
- Pembelajaran pola berjalan manusia dan sistem prostetik
- Teknologi welfare untuk orang berkebutuhan khusus

FORTHCOMING DEVELOPMENT

- *Virtual reality technology for rehabilitation*
- *Human gait learning and prosthetic system*
- *Welfare technology for disabled persons*

FASILITAS

Laboratorium

1. **Laboratorium Elektronika Biomedika B205:**
   - Biomedical Instrumentation
   - Biomedical Signal Processing
   - Rehabilitation Engineering
2. **Laboratorium Biocybernetic Engineering AJ203**
   - Computation, communication and control processes in biological systems and applications in biological, electronic and mechanical systems.

Fasilitas Riset

- Full-band EEG measurement system
- Robust wireless EEG measurement system
- Human hand prosthetic model
- Haptic robot control
- Unmanned vehicle system
- Intelligent mobile robot
- Microprocessor training kit
- Virtual reality technology for physical and mental rehabilitation
- Human gait learning and prosthetic system
- Welfare technology

FACILITIES

Laboratories

1. *Biomedical Electronics Laboratory B205:*
   - *Biomedical Instrumentation*
   - *Biomedical Signal Processing*
   - *Rehabilitation Engineering*
2. *Biocybernetic Engineering Laboratory AJ203*
   - *Computation, communication and control processes in biological systems and applications in biological, electronic and mechanical systems.*

Research Facility

- *Full-band EEG measurement system*
- *Robust wireless EEG measurement system*
- *Human hand prosthetic model*
- *Haptic robot control*
- *Unmanned vehicle system*
- *Intelligent mobile robot*
- *Microprocessor training kit*
- *Virtual reality technology for physical and mental rehabilitation*
- *Human gait learning and prosthetic system*
- *Welfare technology*

KEMITRAAN

- Konsorsium Penelitian Biomedik, Direktorat Riset dan Pengembangan Kemenristek DIKTI
- Direktorat Pendidikan Berkebutuhan Khusus (Tim Braille ITS).
- Tohoku University, Japan.
- University of Groningen, Netherlands.

PARTNERSHIP

- *Consortium of Biomedical Research, Directorate of Research and Development of Ministry of Research and Technology DIKTI*
- *Directorate of Special Needs Education (ITS Braille Team).*
- *Tohoku University, Japan.*
- *University of Groningen, Netherlands.*

No	Institutions
1	PT.TRIMITRA BUANA ENGINEERING
2	PT. ANGKASA PURA I (PERSERO)
3	PT. PHILIPS INDONESIA
4	PT. PLN (PERSERO) LITBANG KETENAGALISTRIKAN
5	PT. INFOGLOBAL
6	PPPPTK VEDC MALANG
7	PT. LEN INDUSTRI (PERSERO)
8	WITEL JATIM SURAMADU PT. TELKOM INDONESIA
9	PT. DIRGANTARA INDONESIA
10	PT. PINDAD (PERSERO)
11	PT. TEMPRINA MEDIA GRAFIKA
12	PT. TROVI RAJAWALI
13	Universitas Padjajaran

Note :

Instansi dalam negeri yang menjalin kerjasama dengan departemen dalam tiga tahun terakhir.

Domestic institutions that intertwine cooperation with the Department in the last three years.

No	Institutions
1	Prof. G. J. Varkerke - Groningen University
2	Japanese Society for Rehabilitation of Persons with Disabilities (JSRPD)
3	Tohoku University
4	Tohoku University and Miyagi Perfectural Government
5	Tohoku University (Graduate School Biomedical Engineering)

Note :

Instansi dalam negeri yang menjalin kerjasama dengan departemen dalam tiga tahun terakhir.

International institutions that intertwine cooperation with the Department in the last three years.

Kontak Kami:

Departemen Teknik Biomedik
Gedung A, B, C, dan AJ
Institut Teknologi Sepuluh Nopember
Kampus ITS - Keputih, Sukolilo
Surabaya, 60111
Telepon : (6231) 5923644
e-mail : biomedik@bme.its.ac.id
http://www.its.ac.id/tbiomedik