

Editors  
Siti Hafidha Abdurrahman  
Denny Wahyu Dwi Mandiyanto  
Dr. Arifin Darmasetyo

# Empowering Young Researchers in the Field of Science and Engineering

Proceedings of the 1<sup>st</sup> Annual Applied Science and  
Engineering Conference in 2016, in conjunction with The International  
Conference on Sport Science, Health, and Physical Education  
16-18 November 2016, Bandung, West Java, Indonesia

ARISE 2016 | ICSSHPE 2016  
Universitas Pendidikan Indonesia



ICSSHPE

Universitas Pendidikan Indonesia

# **1st Annual Applied Science and Engineering Conference (AASEC 2016)**

Held in Conjunction with the International Conference on Sports  
Science, Health, and Physical Education (ICSSHPE)

IOP Conference Series: Materials Science and Engineering  
Volume 180

Bandung, Indonesia  
16 – 18 November 2016

Part 1 of 3

## **Editors:**

**Ade Gafar Abdullah  
Asep Bayu Dani Nandiyanto  
Ari Arfin Danuwijaya**

ISBN: 978-1-5108-3840-6  
ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571

CURRAN ASSOCIATES, INC.  
**proceedings**  
.COM

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by the Institute of Physics  
All rights reserved. The material featured in this book is subject to  
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## PREFACE

The 1st Annual Applied Science and Engineering Conference (AASEC 2016) in conjunction with The International Conference on Sport Science, Health, and Physical Education (ICSSHPE) is motivated by improving the quality of research and development relating to the applied science and engineering. AASEC brings a theme of "Empowering Young Researchers in the Field of Science and Engineering". Thus, this conference has aims: (1) to bring together the scientists, engineers, researchers and practitioners, students, and civil society organization representatives in the scientific forum. (2) To share and to discuss theoretical and practical knowledge about innovation in applied science and engineering.

The conference is hosted by the UPI Publication Center, Universitas Pendidikan Indonesia. Specifically, this conference can be used as a scientific forum for accommodating discussion among young researchers that originated from Indonesia in the field of applied science and engineering. Therefore, the invited speakers in this conference are young researchers that are well-known and reputable in the world.

The conference took place in Bandung, Indonesia, on 18 November 2016. More than 500 papers are participated from various topics including engineering and technology innovation, engineering education, vocational education and training, and innovation in teaching and learning. There are 298 selected papers that go through a strict peer reviewed process, and these papers will be published in the present conference proceedings.

We would like to thank the organizing committee and the members of reviewers for their kind assistance in reviewing the papers. We would also extend our best gratitude to keynote speakers for their invaluable contribution and worthwhile ideas shared in the conference.

The Editors

Dr. Ade Gafar Abdullah

Dr. Eng. Asep Bayu Dani Nandiyanto

Ari Arifin Danuwijaya, M.A.

## LIST OF COMMITTEE

### Chairman:

Dr. Ade Gafar Abdullah (Universitas Pendidikan Indonesia)

### Technical Chairman:

Dr. Eng. Asep Bayu Dani Nandiyanto (Universitas Pendidikan Indonesia)

### Scientific Committee:

Prof. Dr. Asep Kadarohman (Universitas Pendidikan Indonesia)

Prof. Yaya S. Kusumah, Ph.D (Universitas Pendidikan Indonesia)

Prof. Dr. Anna Permanasari (Universitas Pendidikan Indonesia)

Prof. Dr. Sumarto (Universitas Pendidikan Indonesia)

Prof. Dr. M. Syaom Barliana (Universitas Pendidikan Indonesia)

Prof. Dr. Ratih Hurriyati (Universitas Pendidikan Indonesia)

Mahyuddin KM Nasution, M.I.T. Ph.D (Universitas Sumatera Utara)

Dr. Eng. Himsar Ambarita (Universitas Sumatera Utara)

Emerson P. Simulingga, ST, M.Sc, Ph. D (Universitas Sumatera Utara)

Saharman Gea, Ph. D (Universitas Sumatera Utara)

Dr. Zulfan Adi Putra (TMC Chemical, Eindhoven)

Dr. Eng. Sidik Permana (Institut Teknologi Bandung)

Dr. Eng. Tedi Kurniawan (University Malaysia Pahang)

Dr. M. Roil Bilad (Nanyang Technological University)

Dr. Eng. Topan Setiadipura (Badan Tenaga Atom Nasional- BATAN)

Dr. Oki Muraza (King Fahd University of Petroleum and Minerals, Saudi Arabia)

Dr. Farid Fadhilah (Al Imam Mohammad bin Saud Islamic University, Saudi Arabia)

Syeilendra Pramuditya, Ph.D (Institut Teknologi Bandung)

Dr. Suryono (Universitas Diponegoro)

Dr. Artoto Arkundanto (Universitas Jember)

Dr. Mochamad Ali Shafii (Universitas Andalas)

Dr. Yanti Yulianti (Universitas Lampung)

Dr. Yulkifli Amir (Universitas Negeri Padang)

Dr. Mahardika Prasetya Aji (Universitas Negeri Semarang)

Dr. Fiber Manado (Universitas Sriwijaya)

Dr.Eng. Siti Sendari (Universitas Negeri Malang)

Dr. Ida Hamidah (Universitas Pendidikan Indonesia)

Dr. Budi Mulyanti (Universitas Pendidikan Indonesia)

Dr. Rizki Rosjanuardi (Universitas Pendidikan Indonesia)

Dr.Sc. Topik Hidayat (Universitas Pendidikan Indonesia)

Tutin Aryanti, Ph.D. (Universitas Pendidikan Indonesia)

Dr.Eng. Beta Paramita (Universitas Pendidikan Indonesia)

Dr.Eng. Usep Surachman (Universitas Pendidikan Indonesia)

Dr. Selly Feranie (Universitas Pendidikan Indonesia)

Dr. Lilik Hasanah (Universitas Pendidikan Indonesia)

## Peer review statement

All papers published in this volume of *IOP Conference Series: Materials Science and Engineering* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.



This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy. 

## Table of contents

Volume 180 ✓

**2017**

◀ Previous issue    Next issue ▶

**1st Annual Applied Science and Engineering Conference (AASEC), in conjunction with The International Conference on Sport Science, Health, and Physical Education (ICSSHPE) 16–18 November 2016, Bandung, Indonesia**

[View all abstracts](#)

### Preface

OPEN ACCESS

011001

1st Annual Applied Science and Engineering Conference (AASEC), in conjunction with The International Conference on Sport Science, Health, and Physical Education (ICSSHPE).

➤ [View abstract](#)     [View article](#)     [PDF](#)

OPEN ACCESS

011002

Peer review statement

➤ [View abstract](#)     [View article](#)     [PDF](#)

### Papers

OPEN ACCESS

012001

The Profitability Analysis of PT. Garuda Indonesia (Persero) Tbk. Before and After Privatization

I Nurasih and Anggara

➤ [View abstract](#)     [View article](#)     [PDF](#)

OPEN ACCESS

012002

<b>OPEN ACCESS</b>	012009
<b>Simulation of Mechanical Stress on Stainless Steel for Pb-Bi Corrosion Test by Using ABAQUS</b>	
D Irwanto, A P A Mustari and B A Budiman	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	
<b>OPEN ACCESS</b>	012010 ✓
<b>A Model of Small Capacity Power Plant in Tateli Village, North Sulawesi</b>	
F J Sangari and P T D Rompas ✓	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	
<b>OPEN ACCESS</b>	012011
<b>Tunneling Current of Electron in Armchair Graphene Nanoribbon Bipolar Transistor Model Using Transfer Matrix Method</b>	
A K Fahmi, L Hasanah, D Rusdiana, A Aminudin and E Suhendi	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	
<b>OPEN ACCESS</b>	012012
<b>The Mechanical Properties and Microstructure Characters of Hybrid Composite Geopolymers-Pineapple Fiber Leaves (PFL)</b>	
N Amalia, S Hidayatullah, Nurfadilla and Subaer	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	
<b>OPEN ACCESS</b>	012013
<b>Characteristics of Commercial SiC and Synthetic SiC as an Aggregate in Geopolymer Composites</b>	
R Irfanita, K N Afifah, Asrianti and Subaer	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	
<b>OPEN ACCESS</b>	012014
<b>Development of Coconut Trunk Fiber Geopolymer Hybrid Composite for Structural Engineering Materials</b>	
F Amalia, N Akifah, Nurfadilla and Subaer	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	
<b>OPEN ACCESS</b>	012015
<b>Post-treatment Effect of Particleboard on Dimensional Stability and Durability Properties of Particleboard Made From Sorghum Bagasse</b>	
A H Iswanto, T Sucipto, S S D Nadeak and W Fatriasari	
<a href="#">+ View abstract</a> <a href="#">View article</a> <a href="#">PDF</a>	



# TABLE OF CONTENTS

## PART 1

<b>THE PROFITABILITY ANALYSIS OF PT. GARUDA INDONESIA (PERSERO) TBK. BEFORE AND AFTER PRIVATIZATION</b> .....	1
<i>I Nuruziah, Anggara</i>	
<b>THE EFFECT OF GREEN HOME, GREEN BEHAVIOR, AND LIVABILITY ON THE FINANCIAL INCENTIVE IN MEDAN CITY, INDONESIA</b> .....	7
<i>K A Fachrudin, H T Fachrudin</i>	
<b>ASSESSING THE EFFECTS OF SERVICE QUALITY OF GOVERNMENT AND STUDENT SATISFACTION IN EDUCATION'S FIELD</b> .....	13
<i>D Purwaningsih</i>	
<b>IMPACT OF THE ECONOMIC GROWTH AND ACQUISITION OF LAND TO THE CONSTRUCTION COST INDEX IN NORTH SUMATRA</b> .....	20
<i>H B Tarmizi, M Daulay, J Mada</i>	
<b>THE IMPACT OF MODERN RETAIL MINIMARKET TOWARDS THE CONTINUITY OF TRADITIONAL RETAIL BUSINESSES</b> .....	25
<i>R Masruroh</i>	
<b>MECHANICAL PROPERTIES STUDIES OF COMPONENTS FORMULATION FOR MIXING PROCESS CONTAIN OF POLYPROPYLENE, POLYETHYLENE, AND ALUMINIUM POWDER</b> .....	31
<i>A Hamzi, R Dini</i>	
<b>PREPARATION AND CHARACTERIZATION OF CELLULOSE MICROCRYSTALLINE (MCC) FROM FIBER OF EMPTY FRUIT BUNCH PALM OIL</b> .....	38
<i>H Nasution, Yurnaliza, Veronicha, Irmadani, S Sitompul</i>	
<b>THE INFLUENCE OF CHICKEN EGG SHELL AS FILLERS ON BIOCOMPOSITE ACRYLIC RESIN FOR DENTURE BASED</b> .....	46
<i>M Lubis, M H S Ginting, N P Dalimanthe, D M T Hasibuan, S Sastroridharsjo</i>	
<b>SIMULATION OF MECHANICAL STRESS ON STAINLESS STEEL FOR PB-BI CORROSION TEST BY USING ABAQUS</b> .....	53
<i>D Irvanto, A P A Mustari, B A Budiman</i>	
<b>A MODEL OF SMALL CAPACITY POWER PLANT IN TATELI VILLAGE, NORTH SULAWESI</b> .....	59
<i>F J Sangari, P T D Rompas</i>	
<b>TUNNELING CURRENT OF ELECTRON IN ARMCHAIR GRAPHENE NANORIBBON BIPOLAR TRANSISTOR MODEL USING TRANSFER MATRIX METHOD</b> .....	67
<i>A K Fahmi, L Hazanah, D Rusdiana, A Aminudin, E Sahendi</i>	
<b>THE MECHANICAL PROPERTIES AND MICROSTRUCTURE CHARACTERS OF HYBRID COMPOSITE GEOPOLYMERS-PINEAPPLE FIBER LEAVES (PFL)</b> .....	72
<i>N Amalia, S Hidayatullah, Nurjadilla, Subaer</i>	
<b>CHARACTERISTICS OF COMMERCIAL SIC AND SYNTHETIC SIC AS AN AGGREGATE IN GEOPOLYMER COMPOSITES</b> .....	80
<i>R Infanito, K N Affiah, Arianiti, Subaer</i>	
<b>DEVELOPMENT OF COCONUT TRUNK FIBER GEOPOLYMER HYBRID COMPOSITE FOR STRUCTURAL ENGINEERING MATERIALS</b> .....	86
<i>F Amalia, N Akijah, Nurjadilla, Subaer</i>	
<b>POST-TREATMENT EFFECT OF PARTICLEBOARD ON DIMENSIONAL STABILITY AND DURABILITY PROPERTIES OF PARTICLEBOARD MADE FROM SORGHUM BAGASSE</b> .....	92
<i>A H Irvanto, T Sucipto, S S D Nadeak, W Fatrisari</i>	
<b>FIXATION OF SOFT-INNER PART OF OIL PALM TRUNK BY CLOSE SYSTEM COMPRESSION METHOD</b> .....	99
<i>R Hariyanto, W Dwiyanto, I Wahyudi, F Febrianto, T Morsoka</i>	
<b>THE FEASIBILITY OF SUGAR PALM (ARENGA PINNATA) TRUNK FOR RAW MATERIAL OF PARQUET (WOOD FLOORING)</b> .....	108
<i>A Nuryawan, A Tarrigan, I Hakim</i>	
<b>IMPROVED ELECTRICAL PROPERTIES OF CHITOSAN BASED ACETONE SENSOR BY ADDING CARBOXYMETHYLCELLULOSE (CMC)</b> .....	113
<i>T I Nasution, R Azzwa, Y Machrisa, I Nainggolan, M Balyun, R Ramanyah</i>	

<b>OPTIMIZATION ON PADDY CROPS IN CENTRAL JAVA (WITH SOLVER, SVD ON LEAST SQUARE AND ACO (ANT COLONY ALGORITHM))</b> .....	123
<i>H A Parhuwaj, S Trihandarsa, B Susanto, S Y J Prasetyo, Y H Agus, B H Simanjuntak</i>	
<b>SOCIAL SECURITY CONTRIBUTION TO PRODUCTIVITY AND WAGES IN LABOUR ORGANIZATION PERSPECTIVE</b> .....	135
<i>Y N Supriadi</i>	
<b>MODELING OF SEDIMENTATION PROCESS IN THE IRRIGATION CHANNEL</b> .....	146
<i>Tulus, M Situmorang</i>	
<b>DIDACTICAL DESIGN MATERIAL UNITS OF DISTANCE AND SPEED TO DEVELOPED MATHEMATICAL CONNECTION IN ELEMENTARY SCHOOL</b> .....	156
<i>R R Jannah, S Apriliyu, Karlimah</i>	
<b>DISPLACEMENT OF A FREE TYRE IN NATURAL FREQUENCIES TO DETERMINE NOISE STRUCTURE</b> .....	164
<i>M Sabri</i>	
<b>NUMERICAL STUDY ON NATURAL VACUUM SOLAR DESALINATION SYSTEM WITH VARYING HEAT SOURCE TEMPERATURE</b> .....	173
<i>H Ambarita</i>	
<b>PERFORMANCE AND EMISSIONS OF A SMALL COMPRESSION IGNITION ENGINE RUN ON DUAL-FUEL MODE (DIESEL-RAW BIOGAS)</b> .....	184
<i>H Ambarita, E P Smalingga, M Km Nasution, H Kawai</i>	
<b>THE INFLUENCE OF MIXED COMPOSITION AND HOLE MOULD ON THE QUALITY OF CHICKEN FEED</b> .....	194
<i>S Rasyid, T A Susanto, R Nur</i>	
<b>PERFORMANCE AND CHARACTERISTICS OF HEAT PUMP CLOTHES DRIER</b> .....	201
<i>H Ambarita, D M Nasution, S Gunawan, A H Nasution</i>	
<b>DESIGN AND CONSTRUCTION MULTI OUTPUT POWER TRANSMISSION WITH SINGLE PRIME MOVER ON AGRICULTURAL PRODUCTS MACHINE</b> .....	209
<i>V K Koten, C E Tanamal</i>	
<b>NUMERICAL APPROACH TO WOOD PYROLYSIS IN CONSIDERATING HEAT TRANSFER IN REACTOR CHAMBER</b> .....	218
<i>M Idris, U Nivalia</i>	
<b>EXPERIMENTAL STUDY ON MELTING AND SOLIDIFICATION OF PHASE CHANGE MATERIAL THERMAL STORAGE</b> .....	227
<i>H Ambarita, I Abdullah, C A Siregar, R E T Siregar, A D Romowikarto</i>	
<b>A PRELIMINARY STUDY ON DESIGNING AND TESTING OF AN ABSORPTION REFRIGERATION CYCLE POWERED BY EXHAUST GAS OF COMBUSTION ENGINE</b> .....	237
<i>F H Napitupulu, F A Daulay, P M Dedy, Denis, Jecson</i>	
<b>EXPERIMENTAL STUDY ON PERFORMANCE OF A BOX SOLAR COOKER WITH FLAT PLATE COLLECTOR TO BOIL WATER</b> .....	247
<i>T Sitepu, S Gunawan, D M Nasution, H Ambarita, R E T Siregar, A D Romowikarto</i>	
<b>ANALYSIS OF POWER GENERATING SPEED BUMPS MADE OF CONCRETE FOAM COMPOSITE</b> .....	254
<i>B Syam, M Muttaqin, D Hastrius, A Sebayang, W S Basuki, M Sabri, S Abda</i>	
<b>DEVELOPING A HYBRID SOLAR/WIND POWERED DRIP IRRIGATION SYSTEM FOR DRAGON FRUIT YIELD</b> .....	264
<i>I Widiantuti, D S Wijayanto</i>	
<b>APPLICATION OF BIOMASS FROM PALM OIL MILL FOR ORGANIC RANKINE CYCLE TO GENERATE POWER IN NORTH SUMATERA INDONESIA</b> .....	272
<i>T B Nur, Z Pansu, M N Amin</i>	
<b>COMPARISON OF MICROCRYSTALLINE CHARACTERIZATION RESULTS FROM OIL PALM MIDRIB ALPHA CELLULOSE USING DIFFERENT DELIGNIZATION METHOD</b> .....	279
<i>S Yuliasmi, T R Pardede, Nerdya, H Syahputra</i>	
<b>TOP 200 PRESCRIBED DRUGS MOSTLY PRESCRIBED BY THE PHYSICIAN IN PHARMACIES AT MEDAN CITY</b> .....	284
<i>H R Tanjung, E S Nasution</i>	
<b>MODELLING OF DRAIN CURRENT IN TUNNELLING FIELD-EFFECT TRANSISTOR BASED ON STRAINED ARMCHAIR GRAPHENE NANORIBBONS</b> .....	291
<i>E Sahendi, R Syariati, F A Noor, Khairurrijal</i>	
<b>THE CONCEPT MASTERY IN THE PERSPECTIVE OF GENDER OF JUNIOR HIGH SCHOOL STUDENTS ON ECLIPSE THEME IN MULTIPLE INTELLIGENCES-BASED OF INTEGRATED EARTH AND SPACE SCIENCE LEARNING</b> .....	296
<i>W Liliawati, J A Utama, I S Mursyidah</i>	

<b>NEUTRON DISTRIBUTION IN THE NUCLEAR FUEL CELL USING COLLISION PROBABILITY METHOD WITH QUADRATIC FLUX APPROACH</b> .....	301
<i>M A Shafii, D Fitriyani, S H J Tongkukat, A G Abdullah</i>	
<b>DESCRIPTION OF SELF-EFFICACY AND INITIAL COGNITIVE ABILITIES ON THE STUDENTS' PHYSICS LEARNING OF THE DIRECT CURRENT ELECTRICAL CIRCUITS</b> .....	306
<i>Zoemudin, J Maknun, Muslim</i>	
<b>THE CARDIOVASCULAR FUNCTION PROFILE AND PHYSICAL FITNESS IN OVERWEIGHT SUBJECTS</b> .....	313
<i>E R Megawati, L D Labie, F Y Harahap</i>	
<b>THE EFFECT OF SUNLIGHT IN PARENCHYMA PITH CELLS DIAMETER OF MANIHOT ESCULENTA</b> .....	318
<i>D Sunanti, D N Aziz, W Attati, F Nurawati</i>	
<b>DNA PROFILES OF MTG (MODERAT TAHAN GANO) OIL PALM VARIETY BASED ON SSR MARKER</b> .....	323
<i>L A P Putri, H Setiando, R Hardianti</i>	
<b>ASSESSMENT OF NATURAL REGENERATION OF MANGROVE SPECIES AT TSUNAMI AFFECTED AREAS IN INDONESIA AND MALAYSIA</b> .....	328
<i>Ovrizal, A G Ahmad, M Mansor</i>	
<b>PROPAGATION OF VALUABLE NORTH SUMATERA BENZOIN TREES (STYRAX SP) USING MACROCUTTING TECHNIQUE</b> .....	334
<i>A Susilowati, K S Hartini, H H Rachma, M Alvarobly</i>	
<b>THE CORRELATION OF TREE PHENOLOGY WITH NEST NUMBER OF ORANG UTAN SUMATERA (PONGO ABELII) ON PRIMARY FOREST, RESORT SEI BETUNG, GUNUNG LEUSER NATIONAL PARK</b> .....	339
<i>K S Hartini, P Putana, M Oktaviani</i>	
<b>FREQUENCY DRIFT RATE INVESTIGATION OF SOLAR RADIO BURST TYPE II DUE TO CORONAL MASS EJECTIONS OCCURRENCE ON 4TH NOVEMBER 2015 CAPTURED BY CALLISTO AT SUMEDANG-INDONESIA</b> .....	344
<i>M Batabara, T Manik, R Suryana, M Lathif, P Sitompul, M Zamzam, F Muntahana</i>	
<b>SOLAR RADIO BURST DATA PROCESSING OF CALLISTO AND FREQUENCY DRIFT RATE DETERMINATION OF SOLAR RADIO BURST DETECTED BY CALLISTO NETWORK IN INDONESIA</b> .....	353
<i>M Batabara, T Manik, R Suryana, M Lathif, P Sitompul, M Zamzam, F Muntahana</i>	
<b>MUSCLE STRENGTH ENDURANCE TESTING DEVELOPMENT BASED PHOTO TRANSISTOR WITH MOTION SENSOR ULTRASONIC</b> .....	362
<i>A Rusdiana</i>	
<b>MULTI-PIVOT QUICKSORT: AN EXPERIMENT WITH SINGLE, DUAL, TRIPLE, QUAD, AND PENTA-PIVOT QUICKSORT ALGORITHMS IN PYTHON</b> .....	368
<i>M A Budiman, E M Zamzami, D Rachmarwati</i>	
<b>THE DESIGN OF LEXICAL DATABASE FOR INDONESIAN LANGUAGE</b> .....	374
<i>D Gunawan, A Amalia</i>	
<b>CONTINGENCY ANALYSIS OF SOUTH BANDUNG ELECTRIC POWER SYSTEM</b> .....	379
<i>D Fauziah, Y Mulyadi</i>	
<b>CHARACTERIZATION OF MINERALS DEPOSIT PATIMPENG BONE REGENCY, SOUTH SULAWESI THROUGH PETROGRAPHIC</b> .....	388
<i>I E Putri, N D Alvi, Sabar</i>	
<b>IMPLEMENTATION OF DIGITAL SIGNATURE USING AES AND RSA ALGORITHMS AS A SECURITY IN DISPOSITION SYSTEM AF LETTER</b> .....	397
<i>H Siregar, E Janarti, T Hayatno</i>	
<b>COMPARATIVE STUDY ON THE DIFFERENT TESTING TECHNIQUES IN TREE CLASSIFICATION FOR DETECTING THE LEARNING MOTIVATION</b> .....	406
<i>C Juliane, A A Arman, H S Sastramihardja, I Supriana</i>	
<b>ARTIFICIAL NEURAL NETWORK FOR MONTHLY RAINFALL RATE PREDICTION</b> .....	411
<i>H D Purnomo, K D Hariomo, S Y J Prasetyo</i>	
<b>DESIGN OF VIVALDI MICROSTRIP ANTENNA FOR ULTRA-WIDEBAND RADAR APPLICATIONS</b> .....	420
<i>M Y Perdana, T Hariyadi, Y Wahyu</i>	
<b>RECOGNITION OF ROASTED COFFEE BEAN LEVELS USING IMAGE PROCESSING AND NEURAL NETWORK</b> .....	430
<i>T H Nasution, U Andayani</i>	

<b>THE USAGE EVALUATION OF OFFICIAL COMPUTER TERMS IN BAHASA INDONESIA IN INDONESIAN GOVERNMENT OFFICIAL WEBSITES</b> .....	438
<i>A Amalia, D Gunawan, M S Lydia, C Charlie</i>	
<b>OPTIMIZING LIBRARIES' CONTENT FINDABILITY USING SIMPLE OBJECT ACCESS PROTOCOL (SOAP) WITH MULTI-TIER ARCHITECTURE</b> .....	445
<i>A Lahinto, I Haris, T Abdillah</i>	
<b>ON USING GOLDBACH G0 CODES AND EVEN-RODEH CODES FOR TEXT COMPRESSION ON USING GOLDBACH G0 CODES AND EVEN-RODEH CODES FOR TEXT COMPRESSION</b> .....	454
<i>M A Budiman, D Rachmaswati</i>	
<b>GROUNDWATER QUALITY ASSESSMENT IN JAKARTA CAPITAL REGION FOR THE SAFE DRINKING WATER</b> .....	459
<i>M Fady, T F Prayogi, F Mohamad, D Y Zulfaris, M W Mamed, A Daryanto, F Abdillah, E M Nasution, J R Sudianto, B Giaris, F Maliki</i>	
<b>SATELLITE IMAGE EDGE DETECTION FOR POPULATION DISTRIBUTION PATTERN IDENTIFICATION USING LEVELSET WITH MORPHOLOGICAL FILTERING PROCESS</b> .....	466
<i>Harzli, T A Muzandar, A Suhendar, A G Abdullah, D Rokhadi</i>	
<b>A REVIEW OF BIG GRAPH MINING RESEARCH</b> .....	474
<i>I Atantina, B Sitohang, G A P Sagnawati, V S Muertini</i>	
<b>NUMERICAL SIMULATION BIDIRECTIONAL CHAOTIC SYNCHRONIZATION OF SPIEGEL- MOORE CIRCUIT AND ITS APPLICATION FOR SECURE COMMUNICATION</b> .....	484
<i>W S M Sanjaya, D Anugraeni, R Denys, N Ismail</i>	
<b>IMPLEMENTATION OF ELECTRE METHOD IN DETERMINING THE PRIORITY OF A SUSTAINABLE TOURIST ATTRACTION DEVELOPMENT IN GORONTALO REGENCY</b> .....	493
<i>S Nawis, R Mandu, T Rahman, A U Fatmah</i>	
<b>GAME MULTIMEDIA IN NUMERACY LEARNING FOR ELEMENTARY SCHOOL STUDENTS</b> .....	502
<i>D Rokhadi, N Samarna, H Satrio</i>	
<b>GEOGRAPHICAL INFORMATION SYSTEM MODEL FOR POTENTIAL MINES DATA MANAGEMENT PRESENTATION IN KABUPATEN GORONTALO</b> .....	509
<i>D Riviana, A Tajuddin, S Edi</i>	
<b>GEODATA: INFORMATION SYSTEM BASED ON GEOSPATIAL FOR EARLY WARNING TRACKING AND ANALYSIS AGRICULTURAL PLANT DISEASES IN CENTRAL JAVA</b> .....	516
<i>S Y J Prasetyo, Y H Agus, C Dewi, B H Simanjuntak, K D Hartono</i>	
<b>ESTIMATING OF GONYSTILUSS BANCANUS GROWING STOCK IN INDONESIA (CASE STUDY: RIAU AND CENTRAL KALIMANTAN)</b> .....	526
<i>Samsuri, I N S Jaya, T Partomihardjo</i>	
<b>DESIGN AND EXPERIMENT OF ELECTROOCULOGRAM (EOG) SYSTEM AND ITS APPLICATION TO CONTROL MOBILE ROBOT</b> .....	535
<i>W S M Sanjaya, D Anugraeni, R Murtajam, M N Subhki, I Muttajien</i>	
<b>SCHEDULLING ECONOMICAL THERMAL POWER PLANT 500 KV JAVA-BALI SYSTEM USING LAGRANGE MULTIPLIER</b> .....	543
<i>N Sartika, A G Abdullah, D L Hakim</i>	
<b>HIERARCHICAL REGIONAL DISPARITIES AND POTENTIAL SECTOR IDENTIFICATION USING MODIFIED AGGLOMERATIVE CLUSTERING</b> .....	552
<i>T A Muzandar, Azhari, A Muehlhoffah, I Arsyad</i>	
<b>REDUCING THE CONFLICT FACTORS STRATEGIES IN QUESTION ANSWERING SYSTEM</b> .....	560
<i>W Suwarningsih, A Purwarianti, I Supriana</i>	
<b>OPTIMIZE SHORT TERM LOAD FORCASTING ANOMALOUS BASED FEED FORWARD BACKPROPAGATION</b> .....	567
<i>Y Mulyadi, A G Abdullah, K A Rohmah</i>	
<b>PB DISTRIBUTION IN GROUNDWATER AND ITS IMPACT TO THE HEALTH OF INDONESIA'S CAPITAL CITIZEN</b> .....	575
<i>D Y Zulfaris, T E Prayogi, B Y C S Alam, M Fady, M W Mamed, A Daryanto, F Abdillah, E M Nasution, J R Sudianto, B Giaris, F Maliki, N Nurzani</i>	
<b>STRUCTURE AND CONTENT ANALYSIS FOR VOCATIONAL HIGH SCHOOL WEBSITE IN INDONESIA</b> .....	582
<i>H Subagja, A G Abdullah, B Trisno, A B D Nandiyanto</i>	
<b>LOSS OF LOAD PROBABILITY CALCULATION FOR WEST JAVA POWER SYSTEM WITH NUCLEAR POWER PLANT SCENARIO</b> .....	590
<i>I D Azizah, A G Abdullah, W Purnama, A B D Nandiyanto, M A Shufii</i>	
<b>HYBRID ENERGY SYSTEM DESIGN OF MICRO HYDRO-PV-BIOGAS BASED MICRO-GRID</b> .....	598
<i>Nishrina, A G Abdullah, A Risdiyanto, Abi Nandiyanto</i>	

<b>ELECTRICAL LOAD PROFILE ANALYSIS USING CLUSTERING TECHNIQUES</b> .....	607
<i>R Damayanti, A G Abdullah, W Purusama, A B D Nandiyanto</i>	
<b>CAN ARCHITECTURE DESIGN SOLVE SOCIAL PROBLEM?</b> .....	614
<i>S W Ginting, E Tsh Darjonojono, H Sulistyarsa</i>	
<b>SOCIO-CULTURAL IMPACTS IN THE FORMATION OF URBAN VILLAGE</b> .....	623
<i>B O Y Marpanang</i>	
<b>ARCHITECTURE AND MONUMENTAL (STUDY ABOUT FORM IN ARCHITECTURE)</b> .....	638
<i>I F Pane, H Susanto, W Zahroh, R A Siantar</i>	
<b>IMPROVING URBAN CORRIDOR THAT RESPECT TO PUBLIC SPACE</b> .....	646
<i>W Zahroh, N Rahmadhani, A D Nasution, I F Pane</i>	
<b>TOURISM DEVELOPMENT BASED ON GEOPARK IN BAKKARA CALDERA TOBA, INDONESIA</b> .....	654
<i>N Ginting, N Finky Rahman, G Sembiring</i>	
<b>IDENTIFICATION OF INCREASING GREEN BEHAVIOUR IN CITRALAND BAGYA CITY, MEDAN</b> .....	663
<i>D N Andri, B O Y Marpanang, L Suryani</i>	
<b>CULTURAL MAPPING OF THE HERITAGE DISTRICTS IN MEDAN, NORTH SUMATRA</b> .....	671
<i>I Fitri, Ratna, R Situmorang, M Affan</i>	

## PART 2

<b>ISLAMIC MODERNISM AND ARCHITECTURAL MODERNISM OF MUHAMMADIYAH'S LIJO MOSQUE</b> .....	679
<i>A F Pratiwiastuti, T Aryanti</i>	
<b>THE SALMAN MOSQUE: ACHMAD NOE'MAN'S CRITIQUE OF INDONESIAN CONVENTIONAL MOSQUE ARCHITECTURE</b> .....	685
<i>A A R Holik, T Aryanti</i>	
<b>DESIGNING USING LEGO AND UNO-STACKO: A PLAYFUL ARCHITECTURE FOR AN INTEGRATED KINDERGARTEN AND ELEMENTARY SCHOOL</b> .....	690
<i>K Muthomamah, T Aryanti, A Ardiansyah</i>	
<b>THE DOMES: EL WAKIL'S TRADITIONALIST ARCHITECTURE OF QUBA MOSQUE</b> .....	697
<i>A A Mocco, T Aryanti</i>	
<b>DECREASING FREE RADICALS LEVEL ON HIGH RISK PERSON AFTER VITAMIN C AND E SUPPLEMENT TREATMENT</b> .....	701
<i>M S Situmorang, D R Argyuni, Hidayat</i>	
<b>NUTRIENT INTAKE, APOLIPOPROTEIN A5 -1131T-C POLYMORPHISM AND ITS RELATIONSHIP WITH OBESITY</b> .....	709
<i>M. I. Sari, D. I. Sari</i>	
<b>POTENTIAL OF BASIDIOMYCETOUS FUNGI ISOLATED FROM GUNUNG BARUS FOREST NORTH SUMATERA IN DECOLORIZATION OF WASTEWATER OF TEXTILE INDUSTRY</b> .....	716
<i>E Muntir, N Priyanti, D Suryanto, Z Naimah</i>	
<b>MICROENCAPSULATION OF LIMONIN FROM ORANGE JUICE WASTE USING MALTODEXTRIN</b> .....	723
<i>D Cakrawati, M N Hamulyanti</i>	
<b>EFFECT OF ORAL ADMINISTRATION OF TUNGSTEN TRIOXIDE (WO<sub>3</sub>) PARTICLES ON HISTOPATHOLOGICAL FEATURE OF LIVER AND KIDNEY IN RAT</b> .....	731
<i>H S H Muzawaroh, A B D Nandiyanto, G G Gumilar, A Widi, M Subanglit</i>	
<b>DEVELOPING EXPERT SYSTEM FOR TUBERCULOSIS DIAGNOSE TO SUPPORT KNOWLEDGE SHARING IN THE ERA OF NATIONAL HEALTH INSURANCE SYSTEM</b> .....	738
<i>I. Lohya</i>	
<b>COMBINED LOADINGS AND CROSS-DIMENSIONAL LOADINGS TIMELINESS OF PRESENTATION OF FINANCIAL STATEMENTS OF LOCAL GOVERNMENT</b> .....	747
<i>I Mudi, A Dharmady, H S Siregar, I Sudalis</i>	
<b>A NUMERICAL MODEL OF SEAWATER VOLUME AND VELOCITY DYNAMIC FOR MARINE CURRENTS POWER PLANT IN THE BANGKA STRAIT, NORTH SULAWESI, INDONESIA</b> .....	752
<i>P T D Rompas, H Tuansamang, F J Sengari</i>	
<b>IDENTIFICATION OF THE QUALITY SPOT WELDING USED NON DESTRUCTIVE TEST- ULTRASONIC TESTING: (EFFECT OF WELDING TIME)</b> .....	759
<i>A Sifa, T Endraswari, Bachriyaman</i>	

<b>SELF-GIVING AS SPIRITUAL DIMENSION IN LEADERSHIP</b> .....	767
<i>A Benama, N Tariqun, S Maksum</i>	
<b>PRINCIPAL COMPONENT ANALYSIS AND CLUSTER ANALYSIS IN PROFILE OF ELECTRICAL SYSTEM</b> .....	774
<i>Irwani, I Garsiwa</i>	
<b>MAXIMUM POTENTIAL OF THE CAR CABIN TEMPERATURE IN THE OUTDOOR PARKING CONDITIONS AS A SOURCE OF ENERGY IN THERMOELECTRIC GENERATOR</b> .....	780
<i>A Sunawar, I Garsiwa</i>	
<b>VOLTAGE GENERATION OF THREE-PHASE DOUBLE SIDED INTERNAL STATOR AXIAL FLUX PERMANENT MAGNET (AFPM) GENERATOR</b> .....	788
<i>I M W Kastawan, Ruzmana</i>	
<b>FIRE EXTINGUISHER ROBOT USING ULTRASONIC CAMERA AND WI-FI NETWORK CONTROLLED WITH ANDROID SMARTPHONE</b> .....	796
<i>B Siregar, H A Purbu, S Efendi, F Fahmi</i>	
<b>LOW COST, ADVANCED, INTEGRATED MICROCONTROLLER TRAINING KIT</b> .....	802
<i>Y Somantri, I Fushohilar</i>	
<b>ECOHEALTH SYSTEM DYNAMIC MODEL AS A PLANNING TOOL FOR THE REDUCTION OF BREEDING SITES</b> .....	809
<i>T Resjatti, A Raksanagara, H Djubaeni, A Sofyan, A Shandrianti</i>	
<b>INVESTIGATION OF INDONESIAN TRADITIONAL HOUSES THROUGH CFD SIMULATION</b> .....	818
<i>Suhendri, M D Kaernitawan</i>	
<b>INDUSTRIAL ENERGY EFFICIENCY PRACTICES IN INDONESIA: LESSON LEARNED FROM ASTRA GREEN ENERGY (AGEN) AWARD</b> .....	827
<i>A S Telaga, I D Hartanto</i>	
<b>ANALYSIS OF ARCHITECTURAL BUILDING DESIGN INFLUENCES ON FIRE SPREAD IN DENSELY URBAN SETTLEMENT USING CELLULAR AUTOMATA</b> .....	834
<i>L Tambunan, H Salamah, N Ariansa</i>	
<b>BIOGAS TECHNOLOGY ON SUPPORTING "SUSTAINABLE" COFFEE FARMERS IN NORTH SUMATERA PROVINCE, INDONESIA</b> .....	843
<i>N Ginting</i>	
<b>EMISSION FACTOR FROM SMALL SCALE TROPICAL PEAT COMBUSTION</b> .....	848
<i>W Seryawati, E Damamburi, P Lentari, K Dewi</i>	
<b>MAPPING AIR QUALITY INDEX OF CARBON MONOXIDE (CO) IN MEDAN CITY</b> .....	856
<i>I Suryati, H Khair</i>	
<b>ANTHROPOMETRY OF THE MEDAN – NORTH SUMATERA POPULATIONS</b> .....	862
<i>I Siregar, R M Sari, K Sushputri, I Rizkyu, M A Mbachtar</i>	
<b>EFFECT OF TOTAL QUALITY MANAGEMENT ON THE QUALITY AND PRODUCTIVITY OF HUMAN RESOURCES</b> .....	869
<i>I Siregar, A A Nasution, R M Sari</i>	
<b>ANALYSIS OF BUSINESS PROCESS AT PT XYZ BY USING SCOR THREAD DIAGRAM</b> .....	875
<i>M T Sembiring, H C Rambe</i>	
<b>SUPPLIER SELECTION BASED ON THE PERFORMANCE BY USING PROMETHEE METHOD</b> .....	881
<i>T S Sinaga, K Siregar</i>	
<b>IDENTIFICATION AND WASTE REDUCTION ON RUBBER INDUSTRY</b> .....	887
<i>K Sushputri, R M Sari, I Rizkyu, I Siregar</i>	
<b>IDENTIFICATION OF POTENTIAL HAZARD USING HAZARD IDENTIFICATION AND RISK ASSESSMENT</b> .....	895
<i>R M Sari, K Sushputri, I Rizkyu, I Siregar</i>	
<b>MEASUREMENT OF NOISE LEVEL IN ENUMERATION STATION IN RUBBER INDUSTRY</b> .....	902
<i>I Rizkyu, K Sushputri, R M Sari, I Siregar</i>	
<b>LIGHTING QUALITY AFFECTS EYESTRAIN OF OPERATORS AT SORTING STATION IN BEVERAGE INDUSTRY</b> .....	908
<i>Anizar, Erwin</i>	
<b>IMPLEMENTATION OF ANP METHOD IN DETERMINING SUPPLIER TO IMPROVE SERVICE TOWARDS SUPERMARKET CONSUMERS</b> .....	915
<i>A Mulyanto, T H Amalia, D Novian, M R A Kaluku</i>	
<b>MODELLING THE PHYSICAL SYSTEM OF BELAWAN ESTUARY</b> .....	923
<i>A P M Tariqun, D Susandiana, F Iema</i>	
<b>THE PRODUCE OF METHYL ESTER FROM CRUDE PALM OIL (CPO) USING HETEROGENE CATALYST ASH OF CHICKEN BONE (CAO) USING ETHANOL AS SOLVENT</b> .....	929
<i>M S Sinaga, R Fauzi, J R Turnip</i>	

<b>EFFECT OF HYDROCHLORIC ACID CONCENTRATION AS CHITOSAN SOLVENT ON MECHANICAL PROPERTIES OF BIOPLASTICS FROM DURIAN SEED STARCH (DURIO ZIBETHINUS) WITH FILLER CHITOSAN AND PLASTICIZER SORBITOL</b> .....	935
<i>M H S Ginting, R Hasibuan, M Lubis, D S Tanjung, N Iqbal</i>	
<b>EFFECT OF AGITATION ON ACIDOGENESIS STAGE OF TWO-STAGE ANAEROBIC DIGESTION OF PALM OIL MILL EFFLUENT (POME) INTO BIOGAS</b> .....	944
<i>B Triukti, Irvan, H Adipauk, Tazlim, M Turmuzi</i>	
<b>REMOVAL OF METAL IRON FROM GROUNDWATER USING ACEH NATURAL ZEOLITE AND MEMBRANE FILTRATION</b> .....	952
<i>S Mulyati, N Arahman, Syawaliah, Mukramah</i>	
<b>EFFECTS OF PEG MOLECULAR WEIGHTS ON PVDF MEMBRANE FOR HUMIC ACID-FED ULTRAFILTRATION PROCESS</b> .....	959
<i>Syawaliah, N Arahman, Mukramah, S Mulyati</i>	
<b>INFLUENCE OF BRJ58 ON THE CHARACTERISTIC AND PERFORMANCE OF PES MEMBRANE FOR WATER TREATMENT PROCESS</b> .....	967
<i>Mukramah, Syawaliah, S Mulyati, N Arahman</i>	
<b>CHANGES IN METEOROLOGICAL PARAMETERS (I.E. UV AND SOLAR RADIATION, AIR TEMPERATURE, HUMIDITY AND WIND CONDITION) DURING THE PARTIAL SOLAR ECLIPSE OF 9 MARCH 2016</b> .....	974
<i>R Paramitha, R Zaen, A B D Nandiyanto</i>	
<b>BEHAVIOR OF PHOTOVOLTAIC DURING THE PARTIAL SOLAR ECLIPSE IN BANDUNG</b> .....	980
<i>A B D Nandiyanto, A Rusli, A Purnamasari, A G Abdullah, I S Riza</i>	
<b>SYNTHESIS OF POTASSIUM SILICATE NANOPARTICLES FROM RICE STRAW ASH USING A FLAME-ASSISTED SPRAY-PYROLYSIS METHOD</b> .....	986
<i>A B D Nandiyanto, N Permatasari, T N Sucahya, A G Abdullah, L Hasanah</i>	
<b>SYNTHESIS OF POLYURETHANES MEMBRANES FROM RUBBER SEED OIL AND METHYLENE DIPHENYL DIISOCYANATES (MDI)</b> .....	991
<i>Marlina, S Nurman, S Saleha, Fitriani, I Thantihani</i>	
<b>DECOMPOSITION BEHAVIOR OF CURCUMIN DURING SOLAR IRRADIATION WHEN CONTACT WITH INORGANIC PARTICLES</b> .....	998
<i>A B D Nandiyanto, A S Wiryani, A Rusli, A Purnamasari, A G Abdullah, I S Riza</i>	
<b>EXTRACTION OF CURCUMIN PIGMENT FROM INDONESIAN LOCAL TURMERIC WITH ITS INFRARED SPECTRA AND THERMAL DECOMPOSITION PROPERTIES</b> .....	1004
<i>A B D Nandiyanto, A S Wiryani, A Rusli, A Purnamasari, A G Abdullah, Ana, I Widiaty, R Harriyani</i>	
<b>SOLUTION CONCENTRATION AND FLOW RATE OF FE<sup>3+</sup>-MODIFIED PORPHYRIN (RED BLOOD MODEL) ON GIANT MAGNETORESISTANCE (GMR) SENSOR EFFICIENCY</b> .....	1010
<i>A Aminudin, D H Tjahjono, Suprijadi, M Djamal, R Zaen, A B D Nandiyanto</i>	
<b>PREPARATION OF POTASSIUM-POSPHATE-EMBEDDED AMORPHOUS SILICATE MATERIAL FROM RICE STRAW WASTE</b> .....	1015
<i>A B D Nandiyanto, N Permatasari, T N Sucahya, S T Purwanti, H S H Munawaroh, A G Abdullah, L Hasanah</i>	
<b>THE ESTIMATION OF COMPACTION PARAMETER VALUES BASED ON SOIL PROPERTIES VALUES STABILIZED WITH PORTLAND CEMENT</b> .....	1020
<i>A S Lubis, Z A Muiz, M I Pasaribu</i>	
<b>DETERMINATION OF ROUTE DELIVERY IN THE LOGISTIC SERVICE PROVIDER (LSP) BY REVIEWING THE PERFORMANCE OF STREET IN THE CITY OF MALANG</b> .....	1029
<i>I W Agustini, Y Samantri</i>	
<b>THE UTILIZATION OF VOLCANIC ASH AND HIGH RUSK ASH AS MATERIAL STABILIZATION IN CLAY BY UNCONFINED COMPRESSION TEST (UCT) AND CALIFORNIA BEARING RATIO (CBR)</b> .....	1037
<i>I P Hastuty, I S Sembiring, M I Abidin</i>	
<b>SINABUNG VOLCANIC ASH UTILIZATION AS THE ADDITIVE FOR PAVING BLOCK QUALITY A AND B</b> .....	1043
<i>I S Sembiring, I P Hastuty</i>	
<b>CHARACTERISTIC OF MODAL CHOICE PREFERENCE BETWEEN BUS AND TRAIN FROM MEDAN TO KUALA NAMU AIRPORT</b> .....	1049
<i>M Sarbakti, C Bombongan</i>	
<b>STUDY OF ROAD MAINTENANCE PROGRAM PRIORITY, USING THE ANALYTICAL NETWORK PROCESS</b> .....	1058
<i>M Sarbakti, K C Harefa</i>	

<b>COMPARISON OF SEISMIC RESPONSES FOR REINFORCED CONCRETE BUILDINGS WITH MASS AND STIFFNESS IRREGULARITIES USING PUSHOVER AND NONLINEAR TIME HISTORY ANALYSIS</b> .....	1065
<i>D R Teruna</i>	
<b>UDP-LITE ENHANCEMENT THROUGH CHECKSUM PROTECTION</b> .....	1074
<i>Suherman, H Abderrahman, O S Sitampul, N Mubarakah</i>	
<b>DESIGNING RULES FOR ACCOUNTING TRANSACTION IDENTIFICATION BASED ON INDONESIAN NLP</b> .....	1080
<i>I Irwandi, I S Suardi, N U Maulidevi</i>	
<b>DESIGN OF SIMPLE WATER TREATMENT SYSTEM FOR CLEANING DIRTY WATER IN THE RURAL AREA</b> .....	1085
<i>A R D Nandiyanto, N Haristiani</i>	
<b>CHARACTERIZATION OF SODIUM CARBONATE (Na<sub>2</sub>CO<sub>3</sub>) TREATED RICE HUSK ACTIVATED CARBON AND ADSORPTION OF LEAD FROM CAR BATTERY WASTEWATER</b> .....	1093
<i>F Hamam, O Bani, A M Izidharo</i>	
<b>EFFECT OF TURNING FREQUENCY ON COMPOSTING OF EMPTY FRUIT BUNCHES MIXED WITH ACTIVATED LIQUID ORGANIC FERTILIZER</b> .....	1105
<i>B Trisakti, J Lubis, T Husaini, Irvan</i>	
<b>CHARACTERIZATION OF ACTIVATED CARBON FROM RICE HUSK BY HCL ACTIVATION AND ITS APPLICATION FOR LEAD (Pb) REMOVAL IN CAR BATTERY WASTEWATER</b> .....	1113
<i>F Hamam, O Bani, L I Wirani</i>	
<b>ACCELEROMETER SENSOR APPLICATIONS EARLY WARNING SYSTEM TRAIN ACCIDENTS DUE TO LANDSLIDE AT LABORATORY SCALE</b> .....	1124
<i>Alimuddin, F Sulaiman, I H Parindori, R Abdullah, T Firmansyah, M S Syarif</i>	
<b>THE EFFECT OF OPERATING CONDITIONS ON DRYING CHARACTERISTICS AND QUALITY OF GINGER (ZINGIBER OFFICINALE ROSCOE) USING COMBINATION OF SOLAR ENERGY-MOLECULAR SIEVE DRYING SYSTEM</b> .....	1130
<i>R Hasibuan, M A Zamzami</i>	
<b>THE USE OF MANGO SEED ARUM MANIS TYPE (MANGIFERA INDICA L.) AS BIOSORBENT</b> .....	1138
<i>S Pandia, S Amien, N Sanjaya, A Setiawan</i>	
<b>CAN SCIENTIFIC APPROACH IN PHYSICAL EDUCATION IMPROVE CREATIVITY AND PHYSICAL FITNESS OF JUNIOR HIGH SCHOOL STUDENTS LIVING ON COASTAL AREA?</b> .....	1142
<i>B Tarigan, Y Hendrayana, K E Wijaya</i>	
<b>FUNDAMENTAL MOTOR SKILLS OF KINDERGARTEN STUDENTS (A SURVEY STUDY OF THE INFLUENCE OF FINANCIAL CONDITION, PLAYING ACTIVITY, AND NUTRITIONAL STATUS)</b> .....	1148
<i>A Kamalini</i>	
<b>COMPETITIVE ANXIETY, SELF-CHANGE AWARENESS, RESPONSE TO CHANGE-EVENTS, AND SOCIAL COMPARISON AMONG STUDENT-ATHLETES</b> .....	1155
<i>A Rezkinda, J Abraham</i>	
<b>THE RELATIONSHIP BETWEEN SOCIO CULTURAL BACKGROUND AND SPORT ACHIEVEMENT</b> .....	1162
<i>A Sumarno, R Syaifulloh, D Sihumbang</i>	
<b>IMPROVING THE QUALITY OF PHYSICAL FITNESS OF ELEMENTARY SCHOOL STUDENTS BY USING PHYSICAL FITNESS CONTROL BOOK</b> .....	1167
<i>Bafirman</i>	
<b>THE EFFECT OF EMOTIONAL INTELLIGENCE, TRAINING FACILITIES, SELF-COMPETENCE AND MOTIVATION TOWARD COACHES' PERFORMANCE OF PPLP WEST SUMATRA PROVINCE</b> .....	1174
<i>Dauli</i>	
<b>HSP70 EXPRESSION PROFILE IN PREECLAMPSIA MODEL OF PREGNANT RAT (RATTUS NORVEGICUS) AFTER GIVING THE EVOO</b> .....	1179
<i>E Trianti, S Ilyas, Rosidah, S Hutaharan</i>	
<b>EFFECT OF ZONE'S DIET MODIFICATION IN LEVEL OF OXIDATIVE STRESS AND PERFORMANCE OF ATHLETES</b> .....	1185
<i>E S Wahjuni, S Hartoto</i>	
<b>THE EFFECT OF REPETITION TRAINING METHOD ON PPLP DISPORA RIAU PENCAK SILAT ATHLETES' CRESCENT KICK SPEED</b> .....	1191
<i>G Nugroho</i>	
<b>INSTRUMENT DEVELOPMENT OF AUTHENTIC ASSESSMENT FOR MANIPULATIVE FUNDAMENTAL MOTOR SKILL AT ELEMENTARY SCHOOL</b> .....	1196
<i>Hariali</i>	



<b>ANTHELMINTIC INTAKE ON THE NUTRITIONAL STATUS, HEMOGLOBIN CONTENT, AND LEARNING ACHIEVEMENT OF THE ELEMENTARY SCHOOL STUDENT IN SUKARAMI PALEMBANG</b>	1201
<i>Hartati, S Aryanti, S Y Muherman</i>	
<b>THE DEVELOPMENT OF COOPERATIVE LEARNING MODEL BASED ON LOCAL WISDOM OF BALI FOR PHYSICAL EDUCATION, SPORT AND HEALTH SUBJECT IN JUNIOR HIGH SCHOOL</b>	1207
<i>I K Yoda</i>	
<b>EXERCISE PREVENTS MENTAL ILLNESS</b>	1215
<i>K I Purnomo, M Doewes, M K W Giri, K H Setiawan, I P A Wibisono</i>	
<b>MYOCARDIAL PATHOLOGICAL CHANGES IN OVERTRAINING EXERCISE</b>	1221
<i>M K W Giri, M Doewes, H M Jatnika, K I Purnomo, K H Setiawan, I P A Wibisono</i>	
<b>THE IMPLEMENTATION OF VOBAS GAME MODIFICATION TO CRITICAL THINKING ABILITY IN SENIOR HIGH SCHOOL STUDENTS</b>	1229
<i>M R Stephani, A O Solihin, V A Kharisman</i>	
<b>BENEFICIAL HEALTH EFFECT OF AQUAROBIKS (ROLE OF ADIPONECTIN ON WOMEN WITH OBESITY)</b>	1234
<i>M S Baiatul, H Suisanto, W Kusriantanti, Soegiyanto, S Rahayu</i>	
<b>DEVELOPMENT OF SPEED MEASUREMENT SYSTEM FOR PENCAK SILAT KICK BASED ON SENSOR TECHNOLOGY</b>	1241
<i>N Husan, Yulkiqli, Yohandri</i>	
<b>EXTENDED NOISE EXPOSURE INDUCE HEALTH IMPAIRMENT IN MACHINIST AT BANDUNG</b>	1249
<i>N Sylviana, K Devani, D Fahmiaryuri, Y A Dewi, R Andean, R Anggraini, V M Tamaran</i>	
<b>THE EFFECT OF ASTAXANTHIN AND REGULAR TRAINING ON DYNAMIC PATTERN OF OXIDATIVE STRESS ON MALE UNDER STRENUOUS EXERCISE</b>	1257
<i>N Sylviana, H Gunawan, R Lestmana, A Purba, I B Akbar</i>	
<b>THE EVALUATION OF KIDS ATHLETIC MASSING PROGRAM</b>	1263
<i>Ngudiman</i>	
<b>THE EFFECT OF TURMERIC CONSUMPTION TO VO<sub>2</sub>MAX AND LACTATE THRESHOLD</b>	1268
<i>R H Ali, H R D Ray</i>	
<b>MODERATE INTENSITY EXERCISE REDUCED METABOLIC DISEASES</b>	1274
<i>S Arisanti, B A Prasmono</i>	
<b>AEROBIC EXERCISE AND ITS EFFECT ON OXYTOCIN LEVEL AND LABOR PROGRESSION</b>	1281
<i>S Irianti, A B Gnanandjar, S R Krimadi, J S Effendi, D Nataprawira, S Gandamihardja</i>	
<b>FIRST GRADE PRIMARY SCHOOL STUDENTS' PHYSICAL ACTIVITY LEVEL ON PHYSICAL EDUCATION SUBJECT THROUGH LIVE LIFE WELL AT SCHOOL PROGRAM</b>	1287
<i>Setyorini, Suroto, Nantik Indahwati</i>	
<b>DEVELOPMENT OF "TARI PENCAK SILAT NUSANTARA" FOR DEVELOPING AND CONSERVING PENCAK SILAT AS A NATION CULTURAL ASSET TOWARDS GLOBALIZATION</b>	1293
<i>Sirwanstoyo, Kuswarsantoyo</i>	
<b>VOLLEYBALL COACHING PHILOSOPHY PROFILE</b>	1299
<i>Sujarwo, N I Pangastika, C P Widi</i>	
<b>CORE COMPETENCY MEASUREMENT MODEL FOR PROSPECTIVE PHYSICAL EDUCATION TEACHER</b>	1305
<i>Suroto, F D Khury, V C Dinata, A Prambodo</i>	
<b>IMPACT OF SOAP OPERA SHOW "SPORTS" GO BMX ON SOCIAL BEHAVIOR OF CHILDREN</b>	1311
<i>U Z Mikalar</i>	
<b>THE EFFECT OF ANAEROBIC AND AEROBIC EXERCISE ON ENDURANCE AND NON ENDURANCE ATHLETES ON PREMENSTRUAL SYNDROME (PMS)</b>	1315
<i>Umar</i>	
<b>THE QUALITY OF NUTRIENT INTAKE OF TABLE TENNIS ATHLETE</b>	1320
<i>W Welis</i>	
<b>THE NEED TO DEVELOP NURSING CARE SYSTEM IN WEST JAVA</b>	1325
<i>Y Hermayanti, W P A Purwandari, T Adikusuma</i>	
<b>ESSENTIAL ROLE OF SERUM CALCIUM FOR MUSCLE STRENGTH IN FOOTBALL ATHLETES</b>	1331
<i>Yuni, Amiruddin, A Purba, B Tarigan</i>	
<b>QUANTUM BIOFEEDBACK THERAPY FOR SPORT PERFORMANCE</b>	1337
<i>A Firmansah, H R D Ray</i>	

<b>OPTIMIZATION OF MEMORY CAPACITY THROUGH THE GRANTING OF PHYSICAL ACTIVITY TYPE WITH LEVEL OF INTENSITY LOW AND MEDIUM</b> .....	1341
<i>A Mulyana, A Suberman, Y Hendrayana, J A Budiman</i>	
<b>THE IMPACT OF TABATA PROTOCOL TO INCREASE THE ANAEROBIC AND AEROBIC CAPACITY</b> .....	1348
<i>A Sampena, D Z Sidiq</i>	
<b>MENSTRUAL CYCLE: DOES IT INFLUENCE THE ANXIETY AND CONFIDENCE OF THE VOLLEY BALL ATHLETES?</b> .....	1354
<i>B Tarigan, R Pratiwi</i>	
<b>MENSTRUATION CYCLE: DOES IT AFFECT THE VOLLEY BALL ATHLETES' PHYSICAL CONDITION AND PERFORMANCE?</b> .....	1358
<i>B Tarigan, R Pratiwi</i>	
<b>THE VALUES EXPLORATION OF PERCEPTUAL-MOTOR, SOCIOMOTOR, MOTOR FITNESS ABILITY, AND CHARACTERS IN THE TRADITIONAL GAME OF "JEGLUG"</b> .....	1361
<i>Babrucaman</i>	

### PART 3

<b>WEIGHT REDUCTION AND BODY FAT THROUGH ZUMBA DANCE TRAINING AND AEROBIC HIGH IMPACT</b> .....	1368
<i>Berliana</i>	
<b>THE EFFECT OF ENDURANCE AND STRENGTH PHYSICAL ACTIVITY PROGRAM AND NUTRITION EDUCATION TO OBESITY CHILDREN LIFE SATISFACTION</b> .....	1374
<i>D Budiama, D N Arji, And Mudjihartono</i>	
<b>PREDICTORS OF PHYSICAL ACTIVITY AMONGST WOMEN STUDENTS OF TEACHER EDUCATION FOR PRIMARY EDUCATION AT INDONESIA UNIVERSITY OF EDUCATION, SUMEDANG CAMPUS</b> .....	1378
<i>D Dimangsi</i>	
<b>LONG JUMP TRAINING PROGRAMS FOR INDONESIAN ATHLETES</b> .....	1383
<i>E Nugraha, F Dilar, M Amasari</i>	
<b>PHYSICAL EDUCATION LEARNING MEDIA BASED ON ANTROPOMETRICIS MAPPING FOR SMP STUDENTS IN WEST JAVA</b> .....	1390
<i>E Nugraha, H Firmansyah, S Mujianto, D Budiama</i>	
<b>COMPARISON OF TOTAL BURNED CALORIES AND HEART RATE AT VARIOUS POSITION IN FUTSAL</b> .....	1394
<i>A A Purnama, R D R Hamidie, I. Angkawidjaja</i>	
<b>ANALYSIS OF THE CONTRIBUTION OF SELF CONFIDENCE ON HITTING SKILLS THROUGH MENTAL REHEARSAL IMAGERY AND GOAL SETTING IN UKM SOFTBALL UPI</b> .....	1398
<i>G Samario, Carriwan, Salman, T Hilayat</i>	
<b>MODEL DEVELOPMENT OF CLASSIFICATION OF HOMOGENEOUS CLASS LEARNING IN AQUATIC</b> .....	1403
<i>H Firmansyah, A Wahyudi, R Wibisono</i>	
<b>THE EFFECT OF PHYSICAL EDUCATION TEACHING MATERIALS TOWARDS SITUATIONAL INTEREST</b> .....	1410
<i>H Ilmaswati, A Suberman, G F Friskawati, Sriningsih</i>	
<b>CURCUMIN POTENTIALLY TO INCREASE ATHLETE PERFORMANCE THROUGH REGULATED MITOCHONDRIAL BIOGENESIS</b> .....	1414
<i>R D R Hamidie, K Masuda</i>	
<b>THE DIFFERENCE OF TEST RESULTS ENDURENCE USING BLEEP TEST AND BALKE TEST ON FOOTBALL PLAYERS MAUNG BANDUNG FC</b> .....	1421
<i>Herdiles, D H Chaili, Komarudin</i>	
<b>THE EFFECT OF MUSLIM WOMEN'S SPORTSWEAR (JILBAB) TO DEHYDRATION LEVEL AND THERMOREGULATION AFTER EXERCISE</b> .....	1426
<i>I Damayanti, N I Rahayu</i>	
<b>TABATA TRAINING FOR INCREASING AEROBIC CAPACITY</b> .....	1430
<i>I Immanuel, K Suloni</i>	
<b>THE QUALITY OF SOCIAL INTERACTION BETWEEN MARTIAL ART ATHLETES</b> .....	1434
<i>I Purnamasari</i>	
<b>THE EFFECT OF EXERCISE METHOD AND HAND-EYE COORDINATION TOWARDS THE ACCURACY OF FOREHAND TOPSPIN IN TABLE TENNIS</b> .....	1439
<i>I Safari, A Suberman, M Ali</i>	

<b>THE EFFECT OF PHYSICAL FITNESS AND HEALTHY BEHAVIOR TOWARD CONCENTRATION, ANXIETY AND CORTISOL HORMONE</b> .....	1449
<i>J K N Darajat, Nuryadi, A Gumilar</i>	
<b>GENDER ANXIETY CONTROL THROUGH THE OUTDOOR EDUCATION PROGRAM</b> .....	1456
<i>J Karjono</i>	
<b>BARRIERS TO PHYSICAL ACTIVITY ON UNIVERSITY STUDENT</b> .....	1460
<i>Jajat, K Sultoni, A Suberman</i>	
<b>FACTORS INFLUENCING WOMEN IN PAP SMEAR UPTAKE</b> .....	1464
<i>K E Wijayanti, I G Alam</i>	
<b>HEALTH-RELATED FITNESS KNOWLEDGE AND ITS RELATION TO COLLEGE STUDENT PHYSICAL ACTIVITY</b> .....	1469
<i>K Sultoni, Jajat, M Fitri</i>	
<b>SPORTS ACTIVITIES HIGH PERFORMANCE ATHLETES MUSLIM WOMEN IN INDONESIA AND MALAYSIA</b> .....	1473
<i>M Fitri, K Sultoni, N Salamuddin, Mohd Taib Harun</i>	
<b>INSTRUMENTAL DEVELOPEMENT OF 50 METERS FREE STYLE SWIMMING SPEED MEASUREMENT BASED ON MICROCONTROLLER ARDUINO UNO</b> .....	1477
<i>Badrucaman, A Rusliana, M R Gilang, T Martini</i>	
<b>BRAIN JOGGING TRAINING TO IMPROVE MOTIVATION AND LEARNING RESULT OF TENNIS SKILLS</b> .....	1485
<i>M Tafiqur, Komarudin, Mulyana, M Y Saputra</i>	
<b>OPTIMIZATION OF PENCAK SILAT ATHLETES COORDINATION THROUGH BRAIN JOGGING</b> .....	1490
<i>M Y Saputra, Mulyana, Komarudin, H Sutono</i>	
<b>THE EFFECT OF CYCLING TO THE WORKING MOOD</b> .....	1495
<i>M Zaky, A Suberman, H Subarjah, U Umaran</i>	
<b>IMPROVING SELF-CONCEPT THROUGH PENCAK SILAT LEARNING</b> .....	1499
<i>Mulyana</i>	
<b>THE ANALYSIS OF PHYSICAL EDUCATION LEARNING AND ENVIRONMENT OF CHARACTER EDUCATION-BASED SCHOOL</b> .....	1504
<i>Mulyana, A Suberman</i>	
<b>THE SPORT STUDENTS' ABILITY OF LITERACY AND STATISTICAL REASONING</b> .....	1508
<i>N Hidayah</i>	
<b>THE EFFECT OF SOCIAL PARTICIPATION ON ELDERLY LIVE SATISFACTION</b> .....	1513
<i>N Kusmaedi, K Sultoni, H Subarjah</i>	
<b>CORRELATION BETWEEN JUMP PERFORMANCES AND PHASES OF SPRINTING IN INDONESIAN SPRINTERS</b> .....	1517
<i>R Wibisono, C U Abdullah</i>	
<b>QUALITY OF LIFE ATHLETE 2016 PARALYMPIC JABAR</b> .....	1522
<i>S Mujiyanto, M Widyia, F Nugraha, C Ubad</i>	
<b>THE IMPLEMENTATION OF DIVERGENT TEACHING STYLE IN 2013 CURRICULUM CONTEXT (AN ACTION RESEARCH IN SPORT EDUCATION CLASS IN CIMAHU HIGH SCHOOL 4)</b> .....	1528
<i>S Slamet, T Subroto, A Sagrara</i>	
<b>PHYSICAL TEST PROTOTYPES BASED ON MICROCONTROLLER</b> .....	1534
<i>S T Paramitha</i>	
<b>GOAL SETTING WITH ATHLETE'S CONFIDENCE AND MOTIVATION</b> .....	1539
<i>Sagitarian</i>	
<b>PSYCHOMOTOR THERAPY (PMT) FOR AUTISTIC CHILD IN THE SETTING OF INCLUSIVE SCHOOL IN BANDUNG</b> .....	1544
<i>Y Hendriyana, F Pratiwi</i>	
<b>THE ROLE OF KINAESTHETIC PERCEPTION IN SUPPORTING THE ACQUISITION OF SKILLS IN SPORTS GAMES</b> .....	1553
<i>Y Hendriyana</i>	
<b>RELATIVE FREQUENCY OF AUGMENTED FEEDBACK AND MOTOR SKILL LEARNING</b> .....	1559
<i>Y Sanaryadi</i>	
<b>CONTENT VALIDITY ESTIMATION OF ASSESSMENT INSTRUMENT BASED ON VOLLEYBALL INFORMATION SYSTEM OF VOLLEYBALL LEARNING: FIELD RESEARCH</b> .....	1566
<i>Y Yudianta, Y Hidayat, B Hambali, S Slamet</i>	
<b>RUBBER BAT EFFECT OF MAXIMAL BALL VELOCITY IN TABLE TENNIS</b> .....	1572
<i>A Rusliana, D N Ichsan</i>	

<b>COMPARISON OF WHOLE BODY REACTION AND ANTICIPATION REACTION TIME BETWEEN KATA AND KUMITE IN KARATER</b> .....	1576
<i>A Syaiful, A Rusdiana, Samardiyanto</i>	
<b>CONTRIBUTION OF INTELLIGENCE AND EMOTIONAL QOUTIENTS WITH PERFORMANCE ATHLETES PENCAK SILAT</b> .....	1579
<i>E Latifah, A Rusdiana, S Ugelia, D Budiman, M Karmini</i>	
<b>FATIGUE IMPACT TO MECHANICAL MOVEMENT OF MAXIMAL INSTEP KICKING IN SOCCER</b> .....	1584
<i>A Rusdiana, I Immanuel, H R D Ray, M Rahlia, S Haridwin, U Umaran, Nuryudi</i>	
<b>PHYSICAL AND TECHNICAL PROFILES OF GARUDA BASKETBALL CLUB'S 17 TO 18 YEARS OLD MALE GROUP</b> .....	1590
<i>H D N Rohmat, A Rismayadi, R Mustaqim, Y Kuslinar</i>	
<b>DIVERSITY TEACHING GOAL IN PHYSICAL EDUCATION AND SPORT AT SCHOOLS: WHAT IS TEACHING FOR?</b> .....	1596
<i>B Abduljabar</i>	
<b>NARCOTICS MISUSE VICTIMS: IS PHYSICAL EXERCISE FOR THEIR FITNESS NEEDED</b> .....	1601
<i>B Turigun</i>	
<b>THE EFFECT OF BRAIN JOGGING EXERCISE TOWARD THE INCREASE OF CONCENTRATION AND LEARNING ACHIEVEMENT</b> .....	1606
<i>Komarudin, Mulyana</i>	
<b>MODEL OF THE MATERIAL INVENTORY MANAGEMENT USING MULTIMEDIA BASED INFORMATION SYSTEM</b> .....	1612
<i>Sriadhi</i>	
<b>KARAWO MOTIFS IDENTIFICATION BASED ON THE CLASSIFICATION OF USER CHARACTERS WITH NAÏVE BAYES METHOD</b> .....	1619
<i>M H Koniyo, S Laksana, I Hadjaratie, A A Bouty</i>	
<b>A METHOD TO EXTRACT THE FORENSIC ABOUT NEGATIVE ISSUES FROM WEB</b> .....	1627
<i>M K M Nasution, M Hardi, R Stepu, E Simalingga</i>	
<b>DECISION SUPPORT SYSTEMS DEVELOPMENT FOR AN ARTIFICIAL INSEMINATION PROJECT IN COMMUNITY BASED PRECISION LIVESTOCK FARMING</b> .....	1633
<i>C Rudiyanto</i>	
<b>MICROSATELLITE ANALYSIS ON GENETIC VARIATION IN TWO POPULATIONS OF RED MANGROVE RHIZOPHORA MANGLE L. (RHIZOPHORACEAE) AND ITS IMPLICATION TO CONSERVATION</b> .....	1640
<i>M Baryani, S Babu, H Olu</i>	
<b>PROFILE OF OBESITY AND DIABETES MELLITUS IN ADULT FEMALE POPULATION IN NORTH SUMATERA, INDONESIA</b> .....	1646
<i>S Lestari, T Muchrisa, M Danley</i>	
<b>IMPROVING STUDENTS' GRAPHING SKILLS THROUGH QUANTITATIVE-BASED LAB ACTIVITIES</b> .....	1651
<i>N Meisadevi, S Anggraeni, B Suprianto</i>	
<b>INTERPRETATION OF BROWN PLANTHOPER (NILAPARVATA LUGENS STAL.) ATTACKS USING EXPONENTIAL SMOOTHING AND SPATIAL AUTOCORRELATION</b> .....	1656
<i>B H Simanjuntak, S Y J Prasetyo, N Widyananti, Y H Agus, C Dewi</i>	
<b>CLONING AND PHYLOGENETIC ANALYSIS OF ACTIN GENES FROM MANGROVE FAMILY RHIZOPHORACEAE</b> .....	1663
<i>M Baryani, S Babu, H Olu</i>	
<b>THE PREDICTION OF SENSITIVITY TOWARDS UNCANNINESS: AN APPLIED PSYCHOLOGICAL STUDY ON NOVEL READERS IN THE LIGHT OF ANTHROPOMORPHISM AND ATTITUDES TOWARDS THROWNNESS</b> .....	1669
<i>C G E Meullemans, J Abraham</i>	
<b>THE RELATION LEADERSHIP, ORGANIZATION CULTURE AND WORK MOTIVATION ON EMPLOYEES PERFORMANCE</b> .....	1677
<i>Rini, N A Rafika</i>	
<b>FINANCIAL PERFORMANCE ANALYSIS USING ECONOMIC VALUE ADDED (EVA)</b> .....	1688
<i>Endo</i>	
<b>DEVELOPMENT OF MANAGERIAL COMPETENCE THROUGH KNOWLEDGE MANAGEMENT IN SMALL INDUSTRIES IN WEST JAVA</b> .....	1696
<i>Adnan, Sawanto, T Yuniarsih</i>	
<b>PERFORMANCE OF EAM AND MEAM POTENTIAL FOR NITI ALLOYS: A COMPARATIVE STUDY</b> .....	1704
<i>Munaji, Sudarno, D L Purwaningrum, R Arifin</i>	

ENTREPRENEURIAL INTERESTS OF POSYANDU CADRES IN KARANG BEROMBAK VILLAGE WEST MEDAN SUB-DISTRICT MEDAN CITY .....	1711
<i>R F Dalimunthe, Hedy</i>	
FACTORS THAT INFLUENCE FINANCIAL LITERACY: A CONCEPTUAL FRAMEWORK .....	1717
<i>A Fitri</i>	
FINANCIAL SATISFACTION ON SMALL AND MEDIUM BUSINESS IN BRASTAGI CITY .....	1724
<i>B K Hasibuan, Y M Lubis</i>	
ANALYSIS OF EFFECT OF PHYSICAL EVIDENCE AND SERVICE ASSURANCE ON CUSTOMER SATISFACTION AND CUSTOMER LOYALTY IN USING CAR RENTAL SERVICE (PT PUSAKA PRIMA TRANSPORT CASES) .....	1730
<i>A Rachman</i>	
FINANCIAL BEHAVIOR AND PERFORMANCE ON SMALL AND MEDIUM ENTERPRISES IN COASTAL AREA OF MEDAN CITY .....	1744
<i>I Sodalisa, Sedyayuman, N A Butar-Butar</i>	
MERIT SYSTEM IN THE PLACEMENT OF CIVIL SERVANTS AND ITS EFFECT TOWARD PERFORMANCE OF SUB-DISTRICT OFFICE IN LABUHANBATU REGION NORT SUMATERA .....	1750
<i>Z M E Siregar, J Lubis</i>	
TACTICAL APPROACH TO INCREASE MOTIVATION FOR LEARNING STUDENTS ON PHYSICAL EDUCATION TEACHING IN PRIMARY SCHOOLS .....	1759
<i>A Rokhmatyati, L Nur, Elan, G Gumlama</i>	
EFFECT OF CYCLING 20 MINUTES OF BLOOD SUGAR LEVELS IN MALE STUDENTS OF SENIOR HIGH SCHOOL 9 TANGERANG 2015 .....	1765
<i>E H Azhar, A S Sutopo</i>	
THE PHYSICAL CONDITIONS OF PENCAK SILAT ATHLETES .....	1770
<i>F Y Prasetyo</i>	
EFFECT OF PERSONALIZED SYSTEM FOR INSTRUCTIONS (PSI) ON PHYSICAL FITNESS OF SENIOR HIGH SCHOOL NURSING'S STUDENT .....	1775
<i>G F Friskawati, H Ilmarwati, A Suherman</i>	
THE CORRELATION BETWEEN BUTTERFLY SWIMMING TECHNIQUE WITH MOTOR ABILITY AND MOTOR EDUCABILITY .....	1781
<i>Sriningsih, N Sutrisna, D Rahmat N, H Ilmarwati</i>	
FACTORS THAT AFFECT POSBINDUS' PERFORMANCE IN DAYEUKOLOLOT KABUPATEN BANDUNG .....	1788
<i>T A Suparto, D K Sanjaya, R D Susanti</i>	
OXIDATIVE STRESS: COMPARING SUB-MAXIMAL PHYSICAL ACTIVITIES AS A SELF-REMINDER FOR HUMAN HEALTH SYSTEM .....	1794
<i>Y S Mestur, I H Susanto</i>	
CHARACTER BASED PHYSICAL EDUCATION MODEL .....	1802
<i>A Suherman, K Sultoni, H Ilmarwati</i>	
CHARACTERIZATION OF MICROCRYSTALLINE FROM PINEAPPLE LEAF (ANANAS COMOSUS L. MERR) .....	1807
<i>S Yuliasmi, Nedy, A Husni</i>	
ANALYSIS PROVIDING DIESEL-WIND HYBRID ELECTRICAL ENERGY SYSTEM IN TIMOR ISLAND INDONESIA .....	1813
<i>G Tjahjono, T Setiawaty</i>	
DESIGN AND VELOCITY DISTRIBUTION OF RUNNER BLADE OF KAPLAN TURBINE USING CFD (COMPUTER FLUID DYNAMIC) FOR SMALL HYDROELECTRIC POWER PLANT .....	1826
<i>E Permana, Y Rudianto</i>	
INDUCTION OF TOLL-LIKE RECEPTOR (TLR) 2 AND MYELOID88-DEPENDENT TLR-SIGNALING RESPONSE TO AEROMONAS HYDROPHILA INFECTIONS IN GOURAMY (OSPHRONEMUS GOURAMY) .....	1834
<i>D Kusumawaty, S Subandono, A Pancoro, Inp Arysmita</i>	
THETA BRAINWAVE ACTIVITY AS THE RESPONSE TO LAVENDER (LAVENDULA ANGUSTIFOLIA) AROMATHERAPY INHALATION OF POSTGRADUATE STUDENTS WITH ACADSMIC STRESS CONDITION .....	1839
<i>S R Kusumawardani, I I Fitri, Suprijanto</i>	
ROLE OF SURFACE PORES ON FOULING OF POLYVINYLIDENE FLUORIDE MEMBRANES IN SUBMERGED MEMBRANE BIOREACTORS .....	1849
<i>M R Bilal, J Druyts, J F J Vankelecom</i>	

<b>ASPEN HYSYS SIMULATION FOR BIODIESEL PRODUCTION FROM WASTE COOKING OIL USING MEMBRANE REACTOR</b> .....	1853
<i>Y B. Abdurrahman, Z A. Putra, M R Bilal</i>	
<b>URBAN FARMING COMMUNITY SPACE: AN IDEA TO OVERCOME THE DECREASING OF AGRICULTURAL LAND IN KITAKYUSHU, JAPAN</b> .....	1859
<i>T C. Julian, B Paramita</i>	
<b>OPTICAL SENSING PERFORMANCE OF MULTIMODE POLYMER OPTICAL FIBER (POF) COATED WITH ZNO TOWARDS METHANOL VAPOUR</b> .....	1870
<i>B Mulyanti, A B Panjawan, L Hazamah, P Abdurrahman, R E Pambanto, H Ramza, G Sugandi</i>	
<b>KNOWLEDGE WORKER PRODUCTIVITY INDICATORS FOR SMALL CONSULTANT BUSINESSES: A THEMATIC ANALYSIS</b> .....	1879
<i>M C Soudari, E Apriyanti</i>	
<b>MAPPING A VOLCANO HAZARD AREA OF MOUNT SINABUNG USING DRONE: PRELIMINARY RESULTS</b> .....	1884
<i>A P M Turigan, D Suswardhi, M N Fajri, F Fahmi</i>	
<b>PRELIMINARY STUDY OF WATER REPELLENT PROPERTIES OF RED PEPPER SEED OIL</b> .....	1893
<i>F Kurniawan, K A Madarani, N C Wahyulis</i>	
<b>MICROBIAL REDUCTION OF CR (VI) INTO CR (III) BY LOCALLY ISOLATED PSEUDOMONAS AERUGINOSA</b> .....	1900
<i>H S H Munawaroh, G G Gumilar, S Kartikasari, D Kusumawaty</i>	
<b>THE DETERMINANT FACTORS OF REGIONAL DEVELOPMENT TOWARD LAND USE CHANGE IN DELI SERDANG</b> .....	1907
<i>D Lindarta, Srojicilam, Badaruddin, Dendra</i>	
<b>LOW 25(OH)D SERUM MAY NOT REFLECT AT RISK SKELETAL HEALTH BUT NOT WITH BODY MASS INDEX IN WOMEN</b> .....	1914
<i>D K Sari, Z Z Tala, Sri Lestari, S V Hutagalung, R A Ganio</i>	
<b>PREPARATION OF ACTIVATED CARBON FROM PALM SHELLS USING KOH AND ZNCL<sub>2</sub> AS THE ACTIVATING AGENT</b> .....	1921
<i>Yulianoman, Nauruddin, M K Abdul, R A Amiliana, A Hamali, B Rachmanda</i>	
<b>DECISION SUPPORT SYSTEMS FOR PERFORMANCE AND EVALUATION OF TEACHERS IN GENERAL-ENGLISH COURSE BY USING THE SMARTER AND TOPSIS METHODS</b> .....	1928
<i>Rasim, E F Rahman, N F Dewi, L S Rizal</i>	
<b>IMPROVING THE COMPETITIVENESS OF UPI AS A RESEARCH-BASED TEACHING UNIVERSITY</b> .....	1936
<i>R Harriyati, A Surachin, I Lisawati</i>	
<b>RELEVANCE OF HUMAN CHROMOSOME ANALYSIS ACTIVITIES AGAINST MUTATION CONCEPT IN GENETICS COURSE</b> .....	1950
<i>R Erwinayah, Rindi, M Nurjhani</i>	
<b>ALTERNATIVE IMPROVING THE QUALITY OF SUB-VOLTAGE TRANSMISSION SYSTEM USING STATIC VAR COMPENSATOR</b> .....	1958
<i>Hasbullah, Y Mulyadi</i>	
<b>ONLINE CONSUMER REVIEWS ON USING E-SHOPPING SERVICE OF E-COMMERCE</b> .....	1963
<i>R Harriyati, Lisawati, F Rhamdani</i>	
<b>PHYSICO-CHEMICAL CHARACTERISTICS OF MUNG BEAN KEFIR WITH VARIATION LEVELS OF SKIM MILK AND FERMENTATION TIME</b> .....	1972
<i>I Sadiyah, A Nuriaelazari, M N Hamdayani</i>	
<b>DEVELOPMENT OF GEOPOLYMERS COMPOSITE BASED ON METAKAOLIN-NANO ZNO FOR ANTIBACTERIAL APPLICATION</b> .....	1977
<i>Q A Nur, N U Sari, Harisul, Subaer</i>	
<b>CONTINGENCY ANALYSIS OF ELECTRIC POWER SYSTEMS SUB-SYSTEM 150 KV WEST JAVA AREA II</b> .....	1984
<i>T Suciati, Y Mulyadi</i>	
<b>DEVELOPMENT OF WEB-BASED COMPUTER-ASSISTED LANGUAGE LEARNING IN ENGLISH INTENSIVE COURSE</b> .....	1992
<i>R Manda, H Nuraila, W B Indri</i>	
<b>THE IMPACT OF INFLUENCE RANGE FUZZY SUBTRACTIVE CLUSTERING MODIFICATION TO ACCURACY ANOMALOUS LOAD FORECASTING</b> .....	2000
<i>F A Rizpati, A G Abdullah, Y Mulyadi</i>	
<b>THE IMPLEMENTATION OF AEROTROPOLIS CONCEPT ON NEW TOWN PLANNING AND DESIGN IN MEBIDANGRO, SUMATERA UTARA</b> .....	2012
<i>A D Nasution, D D Harisdani, P P Napitupulu</i>	

<b>ORGANOLEPTIC TEST PATISSERIE PRODUCT BASED ON CONSUMER PREFERENCE</b> .....	2022
<i>A Ana, S Subekti, S Hamidah, K Komariah</i>	
<b>MORFOLOGY AND STABILITY OF MICROENCAPSULATION OF LIMONIN USING MALTODESTRIN: MORFOLOGY AND STABILITY</b> .....	2029
<i>D Cakrawati, M N Handayani, E Noor, T C Sunarti</i>	
<b>MICROBIAL REDUCTION OF CR (VI) IN TO CR (III) BY LOCALLY ISOLATED PSEUDOMONAS AERUGINOSA</b> .....	2037
<i>H S H Munawaroh, G G Gumilar, A B D Nandiyanto, S Kartikasari, D Kusumarwati, L Hanmah</i>	
<b>NEW SIMILARITY</b> .....	2043
<i>K M N Mulyuddin, O S Sitompul, S Nasution, H Ambarita</i>	
<b>Author Index</b>	

## A Model of Small Capacity Power Plant in Tateli Village, North Sulawesi

F J Sangari\*, P T D Rompas

Universitas Negeri Manado, Tondano 95618, Indonesia

\*ferry\_sangari@yahoo.com

**Abstract.** The electricity supply in North Sulawesi is still very limited so ubiquitous electric current outage. It makes rural communities have problems in life because most uses electrical energy. One of the solutions is a model of power plants to supply electricity in Tateli village, Minahasa, North Sulawesi, Indonesia. The objective of this research is to get the model that generate electrical energy for household needs through power plant that using a model of Pico-hydro with cross flow turbine in Tateli village. The method used the study of literature, survey the construction site of the power plant and the characteristics of the location being a place of research, analysis of hydropower ability and analyzing costs of power plant. The result showed that the design model of cross flow turbines used in pico-hydro hydropower installations is connected to a generator to produce electrical energy maximum of 3.29 kW for household needs. This analyze will be propose to local government of Minahasa, North Sulawesi, Indonesia to be followed.

### 1. Introduction

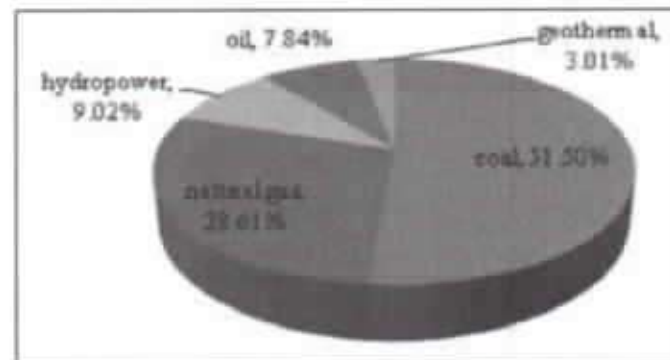
North Sulawesi region more specifically in the villages of Minahasa district has a mountainous topography and has many rivers which is a potential source of enormous energy for power plants which, when carefully planned can overcome the problem of electric energy crisis. Problems that have long and at this time every day power outage for about 2-3 hours a day. However, the electricity crisis was not so much solved using the integral energy source potential flow of river water in the area of North Sulawesi. There are still many villages far from urban areas still do not have adequate power supply [1]. In anticipation of that, it is necessary to build small-scale power plants (1 kW - 5 kW).

Figure 1 shows that the electrical energy production by 2013 in the province of North Sulawesi using water power is still very little 9.02% [2]. It shows that the construction of the hydroelectric power plant is still very much needed in the area of North Sulawesi. Shortage of electricity in rural areas is very likely to occur because it is far from the urban and the power grid, but did not rule urban areas are also experiencing the same thing. In fact, many cities and districts that rely on diesel and hard to come by when the oil, resulting in a power outage in rotation may even are expanded. One solution is emerging development in Indonesia at this time is to find a way out through the construction of power plants micro scale with the power source stream flow and more dependable again when rural communities require the construction of power plants as small as possible, namely less than 5 kW and that can be realized through pico-hydro power plant (PLTPH).

During this time there is a kind of consensus that development PLTPH must have a double impact, not only to improve the provision and equitable distribution of power supply, especially in rural areas but also makes the vehicle to improve the ability of local industry to address the development PLTPH starting from feasibility studies, planning, manufacturing machinery and equipment, to the realization



of the installation. In addition PLTPH development pattern aligned with the level of presence in the form of appropriate technology in rural areas. Rural technology in irrigation development people get almost the same pattern with the construction PLTPH, just need refinement for power knows no season. PLTPH itself is an intermediate technology that has been applied since long ago and is expected to have a positive impact or benefit for the creativity and dynamism of society in lifestyle in order to improve the welfare of rural communities. It is becoming urgency in this study in addition to the efficiency and effectiveness of the construction of power plants, especially in the energy forces turn turbines and planning / selection of appropriate turbine to turn a generator needs to be analyzed.



**Figure 1.** Production of electric energy in North Sulawesi (2013)

Based on the analysis of the energy force of the waterfalls and design analysis turbines, all of which were made through experiments in the laboratory and in the field (in the village where the installation location) to the mounting PLTPH and generate electrical energy production is less than 5 kW is an invention/innovation targeted in research this. PLTPH development is to be realized in the villages Minahasa North Sulawesi province are in accordance with the roadmap of the Indonesian government as shown in figure 2 [3]. In the period 2015-2025, the government has planned the role of government research and development (R & D) that update data on potential PLTPH in the area and manufacturing feasibility study PLTPH, development turbines PLTPH the efficient use of technology crossflow, propeller, and kaplan and system development capacity of 750 kW and the role of manufacturing industries seek turbine development results. Based on the role of government and industry in the 2015-2025 year, the study is in conformity with the government's plan 2015-2025 year on R & D activities are potential PLTPH map updates and the total development of the system. Was further strengthened by the government of North Sulawesi province that integrate and provide services to the activity centers in the region of North Sulawesi province with the publication of the North Sulawesi provincial regulations No. 1 Year 2014 on Spatial Planning of North Sulawesi province from 2014 to 2034 Year Article 22 (a) and 23 (a) that the government regulates the energy network system includes one electric generating system in Minahasa [4].

For the creation of the PLTPH development, it previously had to be done: first, about the theoretical studies as the basis for analysis through literature; second, conduct survey research sites (including survey the village is selected villages that have the potential to obtain characteristics of the villages and communities for the purpose of character education for these communities through socialization to shape the character of the community so that there is a sense of belonging and accept, help build and maintain the power plant in village) in the form of: discharge of river water, river water dam layout, long conductive flow of water to the location of the water falls, the water level fell, and location of turbines; Third, experiments in laboratory experiments in the form of high variation of water falling; Last, economic analysis and supply to the local government Minahasa district for expansion into other villages potentially built PLTPH.

Pico-hydro is hydro power with a maximum electrical output of 5 kW [5] [6] [7]. The system is beneficial in terms of cost and simplicity from a different approach in the design, planning and installation from the power applied to the water is greater. The latest innovations in pico-hydro

technology have made an economic powerhouse even in some of the poorest places in the world and can be accessed. It is also a versatile resource. AC electricity possible can be produced from a standard electrical equipment to be used. Common examples of devices that can be powered by pico-hydro are light bulbs, radio and television.

Typically, pico-hydro power systems are found in rural areas or hilly. Figure 3 shows an example of a typical application of pico-hydro hydro system in hilly areas [7][8]. This system will operate using a container of water on which a few meters from the ground. From the reservoir, the water flows downhill through the piping system and it allows the water to turn turbines. Thus, the turbine will rotate the alternator to produce electricity. However, this study was conducted to demonstrate the potential of consuming water that is distributed to homes in rural areas as an alternative renewable energy source. The flow of water in the pipe has the potential and kinetic energy will be converted into the potential energy of motion of the turbine which then into electrical energy in generators.

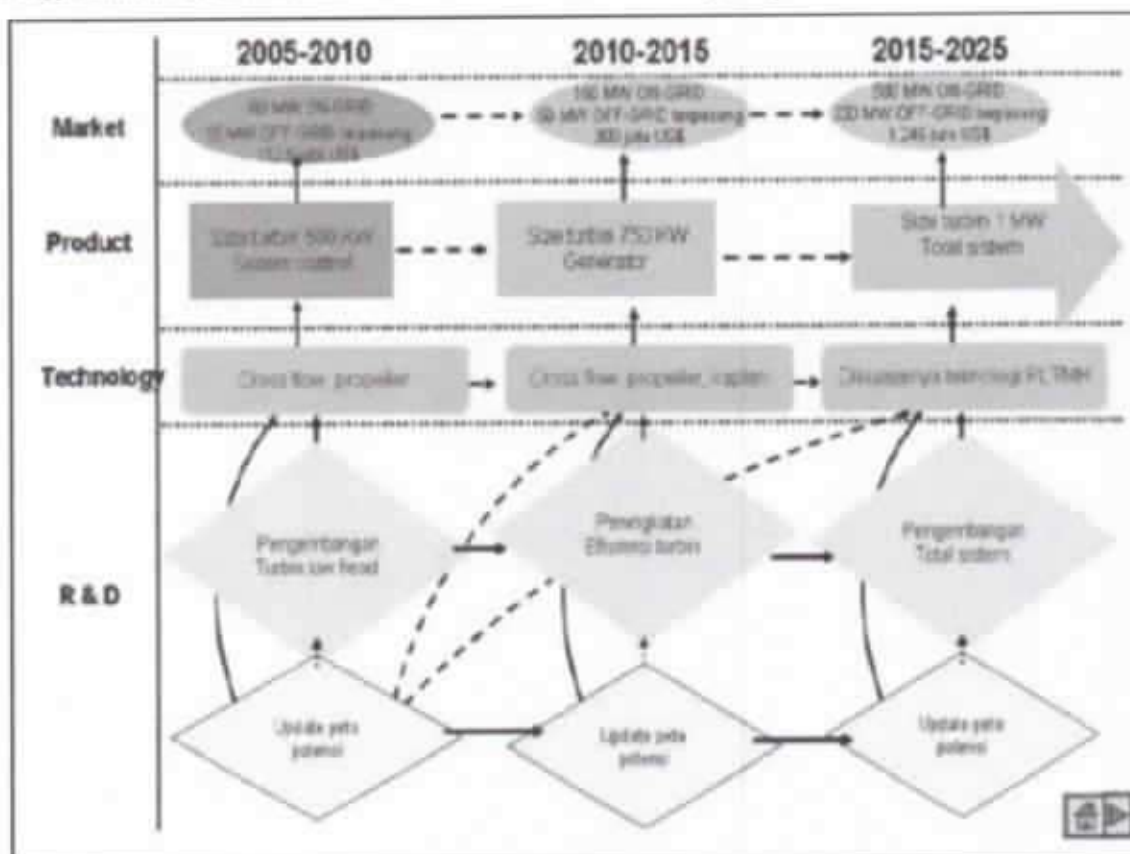


Figure 2. Roadmap of PLTPH development in Indonesia

Technically, pico-hydro has three main components: water (as a source of energy), turbine and generator [9] [10]. Pico-hydro get energy from the flow of water that has a certain altitude difference. Basically, pico-hydro utilized the potential energy of water falling (head). The higher the water falls, the greater the potential energy of water that can be converted into electrical energy. In addition to geographical factors (layout of the river), the height of falling water can also be obtained by stemming the flow of water so that the water level is high. Air flowed through a pipe plant rapidly into the house in general was built on the banks of the river to drive turbines or waterwheels pico-hydro. Mechanical energy derived from rotation of the turbine shaft is converted into electrical energy by a generator.

The objectives of this research is to get the model of efficient and effective from cross flow turbine models for installation in PLTPH which generates electrical energy production of less than 5 kW for a household in the village Tatali Minahasa North Sulawesi.

### 1.1. Impulse Turbine

The principle works: water flowing perpendicular to the turbine shaft through the rapidly incoming pipe at high speed and push the rotor blades of the turbine, causing the turbine rotor rotation [9] [10] [11]. The pressure drop in the water flow in the nozzle and the turbine wheel operates at atmospheric pressure. The examples of Cross flow Impulse Turbines (figure 4) are a Pelton wheel, wheel Turgo and crossflow turbine (Banki-Michell). Impulse turbines generally operate best with medium or high head above 10 m.

### 1.2. Reaction Turbine

Reaction turbines operate under pressure inside the stator (casing). When water passing through the stator in the direction of the turbine shaft helical, causing a whirlpool. The flow was then directed by the blades of the turbine wheel. The angular momentum of the forces in the water rotates the turbine wheel. In contrast to the impulse turbine, the water pressure drops in the stator and the turbine wheel. Examples of a reaction turbine (figure 5) is Propeller (propeller), Kaplan, and Francis, Screw and kinetic turbines water (used to lower head is less than 5 m). Reaction turbines often have houses and geometry turbine blades of a complex which makes it more difficult to process large-scale production of the smallest in the settings in developing countries. However, the reaction turbine can perform well even in low head distance of less than 10 m, thus making it more desirable since the low head of water resources are more accessible and closer location. Water turbines can be classified in two categories namely [11] [12]:

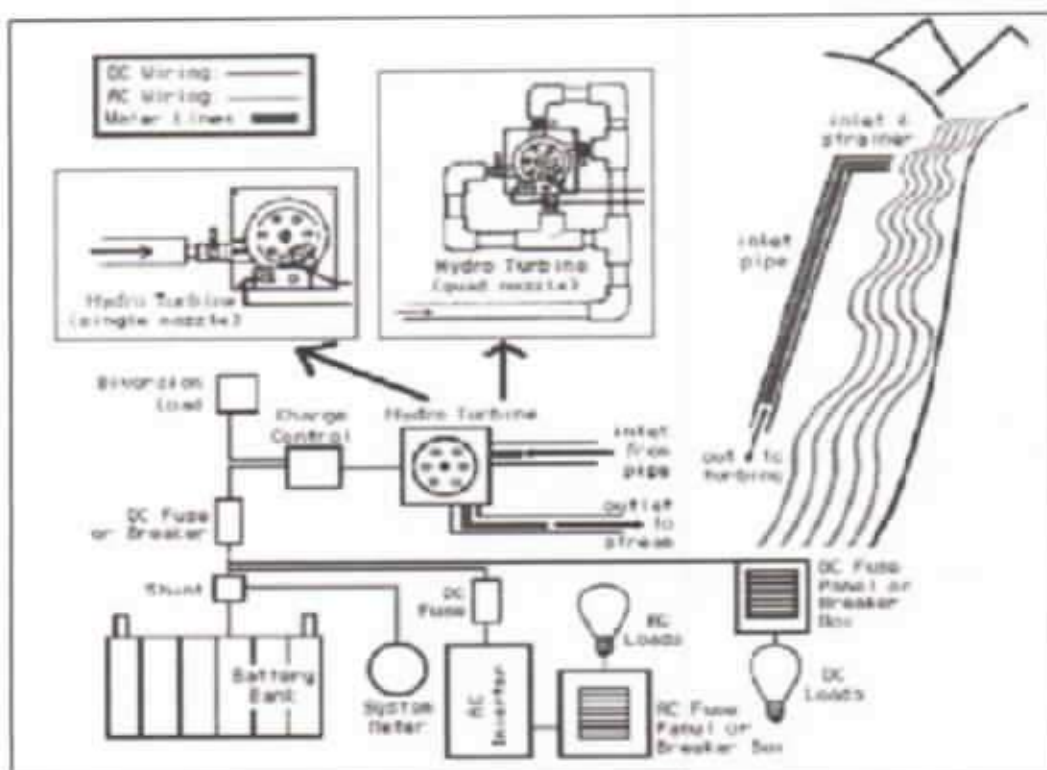


Figure 3. Examples of application of pico-hydro power systems in rural areas

Turbin power ( $P_t$ ) defined [9] [10]:

$$P_t = \rho \cdot g \cdot H \cdot Q \cdot \eta \quad (1)$$

where  $\rho$  is water density (1000 kg/m<sup>3</sup>),  $g$  is gravity (m<sup>2</sup>/s),  $H$  is head,  $Q$  is water flow (m<sup>3</sup>/s), and  $\eta$  is turbine efficiency (normally 70-80 % depend on turbine type).

Calculation of Electric Power and Energy:

Power turbine shaft:

$$P_t = 9.81Q \quad (2)$$

Power is transmitted to the generator:

$$P_{ti} = 9.81Q \eta_{tb} \quad (3)$$

Power generated generator:

$$P = 9.81Q \eta_{tb} \eta_{gb} \quad (4)$$

Where  $\eta$  = turbine efficiency (0.74 and 0.75 for the cross flow turbine to turbine axial),  $\eta_{belt}$  = transmission efficiency, 0.98 for a flat belt, 0.95 for the V belt,  $\eta_{gen}$  = generator efficiency

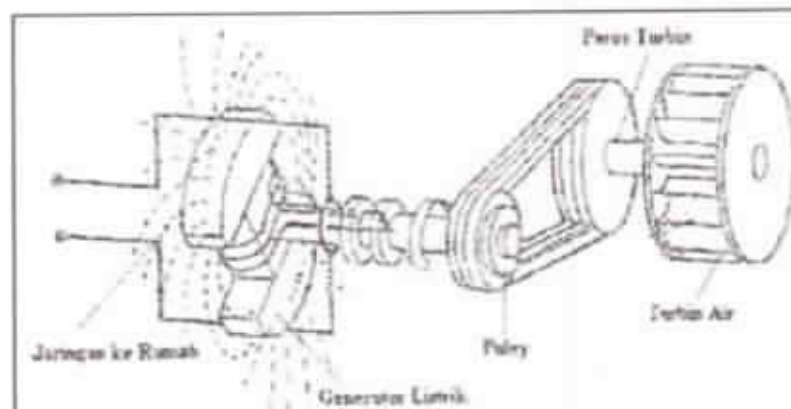


Figure 4. Type of crossflow impulse turbine

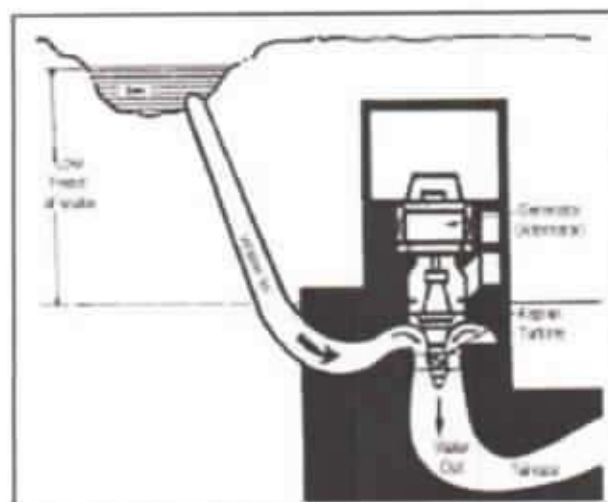


Figure 5. Type of axial reaction turbine

This generator power generated will be distributed to users. In planning the required amount of power at the load center should be under the power capacity is raised, so that the power supply voltage is stable and the system becomes more reliable (long).

The water flowing with capacity and a certain height distributed to the house installation (casing). At home the turbine, the water plant will pound turbine, turbine ascertained in this case will receive the water energy and convert it into mechanical energy in the form of turbine shaft rotation. The rotating shaft is then connected to the generator by using the tire/belt. Of the generator will produce electricity that will go into the control system before the electrical current supplied to homes or other purposes (load). That briefly the process of pico-hydro, alter energy flow and water level into electrical energy [10].

## 2. Approach method

The method used literature study, site survey research (including survey the village in order to obtain the characteristics of villages and rural communities Tateli for the purpose of character education for these communities in receiving, helped build and maintain the power plant), analysis beginning on the ability of electric power, and discussions with local authorities (see figure 6). Conducting preparatory activities before carrying out such research; reflecting the result of socialization, preparation of materials and experimental tools, setting work schedules. Data collection in the village Tateli form: discharge of river water, water velocity, channel length conductor, high waterfalls, and location of the turbines. Methods of direct observation in the field through measures such as speed streams and cross-sectional area perpendicular to the water flow of the river to get water discharge flowing river as initial data in the analysis of the ability of river water, and then to analyze the electrical energy taken preliminary data height measurements falling water (planned 1.34 m) including measuring the distance from the dam to the water fall. Technique of direct measurement with the following procedure: first measure the water velocity and the second measuring cross-sectional area perpendicular to the flow of river water in order to get water discharge (cross-sectional area multiplied by the speed of the water,  $m^3/s$ ), and the last measure the height of falling water to get the length of the aqueduct of dam water to the waterfall.



**Figure 6.** Location of research in village Tateli, Minahasa

Analyze and calculate a preliminary survey in the form of the findings of the theory through literature, site survey and collection of field data and then analyze the debit mainstay and planning ability hydroelectric developed in the planning and continued in the field with a pass calculation electrical energy through analysis of turbine and generator, voltage, and power generated. Finally, proceed with analyzing the PLTPH development costs.

## 3. Results and discussion

The analysis results of water capability that obtained from basis of the gross calculation before analysis further can be seen in table 1. The water discharge ( $Q$ ) is planned to enter the pipe rapidly with water fall head of 1.34 m and if we calculate minimum water flow of 20% of the water flow was then obtained

91.6 l litre/s. Generates power without taking into account the total efficiency of 5.12 kW and if we take into account the total efficiency of 0.643, the installed power of 3.29 kW.

**Table 1.** Results of water and power capability analysis

$Q$ (m <sup>3</sup> /s)	$H_{\text{total}}$ (m)	$H_{\text{losses}}$ (m)	$H_{\text{eff}}$ (m)	$P$ (kW)	$P'$ (kW)
0.458	1.34	0.134	1.2	5.12	3.29

Table 2 shows the results of the analysis of electrical energy which is calculated based on the total efficiency, the force of gravity, high falls and the actual effective water obtained from the difference between the height of fall slop and total loss of height of falling water (0.1 m previously planned 0.134 m). The total energy obtained during a year high real effective water fall of 1.2 m was 29.335 MWh with installed power of 3.29 kW. Total electrical energy obtained within a year of 29,335 kWh. If we calculate the value of selling electricity to PLN by calculating the total cost of expenditure per year of IDR 25 million, the value of the electricity sold at IDR 852/kWh.

All of the results are showed that the electrical energy needs can be fulfilled not only for the village Tateli but also other villages nearby. So as to realize it, then the results of this study will be proposed to local governments Minahasa to be realized in order to meet the needs of not only domestic but also for street lighting and other facilities available in the village Tateli.

**Table 2.** Results of electrical energy analysis

$\sum \eta$	$H_{\text{eff}}$ (m)	$Q_{\text{av}}$ (m <sup>3</sup> /s)	$Q_{\text{pr}}$ (m <sup>3</sup> /s)	$Q_{\text{res}}$ (m <sup>3</sup> /s)	$\sum E$ (MWh)
0.643	1.2	0.458	0.407	0.254	29.335

#### 4. Conclusions

The ability of hydroelectric power of 5.12 kW is installed or the electrical power produced by the capability of the water. The effective head of 1.2 m with the generated power of 3.29 kW and water flow of 0.458 m<sup>3</sup>/s. The total energy is obtained within a year is 29.335 MWh. The electrical needs could be satisfied in Tateli. This model will be proposed to local government of Minahasa, North Sulawesi, Indonesia to be followed.

#### 5. Acknowledgments

The Authors gave the highest appreciation to DRPM Kemenristekdikti Jakarta Republic of Indonesia that has funded all of these activities. Also, thank to head of Tateli village, Minahasa, North Sulawesi, Indonesia who had been allowed for implementing this study.

#### References

- [1] *Harian Metro* 30 September 2014 Pemadaman Meresahkan, PLN Mengaku Kekurangan Pasokan Listrik. <http://www.harianmetro.co.id/index.php/2013-02-02-05-25-09/minsel-mitra/19104-pemadaman-meresahkan-pln-mengaku-kekurangan-pasokan-listrik#.VTJcuPCPxVc> Accessed on February 15 2016
- [2] PT PLN (Persero) 2014 Statistik PLN 2013 Sekretariat Perusahaan PT PLN (Persero) ISSN 0852-8179 No. Publikasi: 02601-140722 <http://www.pln.co.id/dataweb/STAT/STAT2013IND.pdf> Accessed on January 23 2015
- [3] Indonesia 2005-2025 Buku Putih. 2006. Penelitian, Pengembangan dan Penerapan Ilmu Pengetahuan dan Teknologi Bidang Sumber Energi Baru dan Terbarukan untuk Mendukung Keamanan Ketersediaan Energi Tahun 2025, Kementerian Negara Riset dan Teknologi Republik Indonesia. Jakarta
- [4] Peraturan Daerah Provinsi Sulawesi Utara No. 1 Tahun 2014 tentang Rencana Tata Ruang Wilayah Provinsi Sulawesi Utara Tahun 2014-2034

- [5] Basar M F., Sapice R, Rahman S, Hamdan Z, Borhan S and Sopian K 2014 *Advances in Environmental Biology* 8 14 147-151
- [6] Martin S and Sharma A B 2014 *International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)* 3 6 2121-2126
- [7] Zainuddin H, Yahaya M S, Lazi J M, Basar M F M and Ibrahim Z 2009 *World Academy of Science, Engineering and Technology* 59 154-159
- [8] Maher P and Smith N 2001 *Pico Hidro Potencia para Aldeas: Un Manual Práctico para Instalaciones de hasta 5 kW en Terrenos de Pendientes Fuertes. Ed. 2.0* [http://www.riaed.net/IMG/pdf/Pico\\_Hidro\\_-\\_Potencia\\_para\\_Aldeas\\_1.pdf](http://www.riaed.net/IMG/pdf/Pico_Hidro_-_Potencia_para_Aldeas_1.pdf). Accessed on March 5 2015
- [9] Kapoor R 2013 *International Journal of Scientific Research* 2 9 159-160
- [10] Nimje A A and Dhanjode G 2015 *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)* 9 1 Ver. III 59-67
- [11] At-Tasneem M A, Azam W M and Jamaludin U 2014 *World Applied Sciences Journal (Innovation Challenges in Multidisciplinary Research & Practice)* 30 420-423
- [12] Sangal S, Garg A and Kumar D 2013 *International Journal of Emerging Technology and Advanced Engineering* 3 3 424-430



# SJR

Scimago Journal &amp; Country Rank

Enter Journal Title, ISSN or Publisher Name

Home **Journal Rankings** Country Rankings Viz Tools Help About Us

Conferences and Proceedings  2017

All subject areas  United Kingdom

All subject categories

Only Open Access Journals  Only ScieLO Journals  Only WoS Journals

Display journals with at least 0

Citable Docs. (3years)









Apply

Download data

1 - 50 of 203 < >

Title	Type	↓ SJR	H Index	Total Docs. (2017)	Total Docs. (3years)	Total Refs. (2017)	Total Cites (3years)	Citable Docs. (3years)	Cites / Doc. (2years)	Ref. / Doc. (2017)	
1 <a href="#">BMVC 2014 - Proceedings of the British Machine Vision Conference 2014</a>	conference and proceedings	1.253	21	0	132	0	1011	130	0.00	0.00	
2 <a href="#">Proceedings of the Prehistoric Society</a>	conference and proceedings	0.695	20	14	43	1089	62	43	1.59	77.79	
3 <a href="#">Technical Digest - International Electron Devices Meeting</a>	conference and proceedings	0.586	104	233	453	2831	1038	449	2.31	12.15	
4 <a href="#">Proceedings of the National Conference on Artificial Intelligence</a>	conference and proceedings	0.545	104	0	1162	0	3223	1147	2.85	0.00	



Title	Type	↓ SJR	H Index	Total Docs. (2017)	Total Docs. (3years)	Total Refs. (2017)	Total Cites (3years)	Citable Docs. (3years)	Cites/ Doc. (2years)	Ref./ Doc. (2017)	
19 <a href="#">IEEE/IAFE Conference on Computational Intelligence for Financial Engineering, Proceedings (CIFER)</a>	conference and proceedings	0.217	15	0	70	0	52	68	0.00	0.00	
20 <a href="#">IOP Conference Series: Materials Science and Engineering</a>	conference and proceedings	0.201	24	8740	6860	122203	3732	6627	0.57	13.98	
21 <a href="#">12th IET International Conference on Developments in Power System Protection, DPSP 2014</a>	conference and proceedings	0.197	6	0	169	0	63	168	0.00	0.00	
22 <a href="#">International Conference on Nuclear Engineering, Proceedings, ICONE</a>	conference and proceedings	0.195	19	71	1134	980	207	1125	0.18	13.80	
23 <a href="#">Proceedings of the International Conference on Engineering Design, ICED</a>	conference and proceedings	0.191	18	432	421	10432	201	407	0.49	24.15	
24 <a href="#">BHR Group - 17th International Conference on Multiphase Technology 2015</a>	conference and proceedings	0.189	6	0	36	0	33	34	0.97	0.00	
25 <a href="#">IEEE International Conference on Microelectronic Test Structures</a>	conference and proceedings	0.189	19	36	128	362	68	123	0.58	10.06	



SJR

Scimago Journal &amp; Country Rank

Enter Journal Title, ISSN or Publisher Name

[Home](#)[Journal Rankings](#)[Country Rankings](#)[Viz Tools](#)[Help](#)[About Us](#)

# IOP Conference Series: Materials Science and Engineering

**Country** [United Kingdom](#) · [SJR Ranking of United Kingdom](#)

**Subject Area and Category** [Engineering](#)  
[Engineering \(miscellaneous\)](#)

[Materials Science](#)  
[Materials Science \(miscellaneous\)](#)

**Publisher**

**Publication type** [Conferences and Proceedings](#)

**ISSN** [17578981](#), [1757899X](#)

**Coverage** [2009-ongoing](#)

**Scope** The open access IOP Conference Series provides a fast, versatile and cost-effective proceedings publication service for your conference. Key publishing subject areas include: physics, materials science, environmental science, bioscience, engineering, computational science and mathematics.

[Homepage](#)

[How to publish in this journal](#)

[Contact](#)

[Join the conversation about this journal](#)

24

H Index

Ad closed by Google

[Stop seeing this ad](#)[Why this ad?](#)

SJR

+

Citations per document

+