

2nd Talenta Conference on Engineering, Science and Technology

IOP Conference Series: Materials Science and Engineering
Volume 801

Medan, Indonesia
17 October 2019

Part 1 of 2

Editors:

**Irvan
Indra Surya
Himsar Ambarita
Badorul Hisham
Edward Halawa**

**Hiroyuki Daimon
Toru Matsumoto
Edy Harianto Majlan
Mohammad Taherzadeh
Petr Valasek**

ISBN: 978-1-7138-4722-9
ISSN: 1757-8981

Printed from e-media with permission by:

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



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

This work is licensed under a Creative Commons Attribution 3.0 International Licence.
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

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

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
Web: www.proceedings.com

TABLE OF CONTENTS

PART 1

Preface

Opening Speech

Peer review statement

Potential of Merdeka Square area as the gateway of Medan City	1
<i>DD Harisdani, D Lindarto, H Suwanto</i>	
Evaluation of compressive strength investigation on job mix test object and core drill test object.....	7
<i>Torang Sitorus, Indra Jaya</i>	
Urban square as a strip development revitalization element (case study: Dr Mansur street corridor, Medan City).....	13
<i>D Lindarto, DD Harisdani</i>	
What is the impact of additional runway to obstacle limitation surface area?.....	19
<i>Ari Sandhyavitri, Fatimah Insani Harahap</i>	
Current assessment and future projections of landing movement area capacity.....	25
<i>Ari Sandhyavitri, Wika Arifiani</i>	
Effect the silica sand percentage as substitution of fine aggregate on the concrete compressive strength.....	30
<i>N Nursyamsi, I Maulana</i>	
Soil Improvement for clay with limestone and glass slag based on CBR value.....	38
<i>Ika Puji Hastuty, Roesyanto, M Ridwan Anas, Adi Nasution</i>	
Vulnerability analysis of landslide at Sibolangit using Geographic Information System (GIS) based on population density and slope gradient	47
<i>Ika Puji Hastuty, Fauziah Ahmad, Roesyanto, M Ridwan Anas, Yossi R Hidayati</i>	
The use of bottom ash and limestone as soil stabilization material based on unconfined compression test	57
<i>Ika Puji Hastuty, Roesyanto, Daniel Stephanes</i>	
Measuring regional cohesion effects of new toll roads investments: an accessibility approach	64
<i>Ridwan Anas, Ika Puji Hastuty, Irwan S. Sembiring, Yosi Sukmono</i>	
Evaluation of toll rates based on ATP / WTP and BKBOK case studies: Medan-Binjai and Medan-Tebing Tinggi toll roads	68
<i>Ridwan Anas, Irwan S Sembiring, Ika Puji Hastuty</i>	
Evaluation of paratransit performance as public transport in Medan City	73
<i>Ridwan Anas, Ami Kholis Hasibuan, Dimas Bayu Endrayana Dharmowijoyo, Irwan S. Sembiring, Rezky Ariessa Dewi</i>	
Shear strength parameters of peat soil of district of Asahan by direct shear test.....	78
<i>Roesyanto, A. S. Ritonga</i>	

Effect of compaction and direct shear test values on peat soil of Batubara Regency, Sumatera Utara Province.....	84
<i>Roesyanto, Vini Rizki Eka Putri</i>	
Review of consolidation test on peat soil of Batubara Regency Sumatera Utara Province.....	91
<i>Roesyanto, A Ramayanti</i>	
Evaluation of loading rate to the stress-strain response of reinforcing steel bar.....	99
<i>R A Idhar, J Sjah, N Handika, E Tjahjono</i>	
Classification and consolidation test on peat soil of Asahan Regency Sumatera Utara Province	106
<i>Roesyanto, F Shakila</i>	
Review CBR (California Bearing Ratio) value on peat soil Paya Pinang plantation of sub-district Laut Tador Batubara Regency.....	114
<i>Roesyanto, B Taminta</i>	
Study of CBR (California Bearing Ratio) value on peat soil of Asahan Regency Sumatera Utara Province.....	121
<i>Roesyanto, T P Lestari</i>	
Study on displacement and strain of concrete cubes using digital image correlation (DIC)	128
<i>Nadia Putri Wijanarko, Essy Arijoeni, Bastian Okto Bangkit Sentosa</i>	
Integrated systems of major drainage and minor drainage towards low impact development	135
<i>R I Siregar, N Nursyamsi, I Indrawan, R A Sembiring, R Karolina, R A Dewi</i>	
Numerical study of damage index of 2d steel building with eccentrically braced frame using OPENSEES	142
<i>Victor Jonathan, Mulia Orientilize, Bastian Okto Bangkit Sentosa</i>	
A study of calcium hydroxide as a stabilizing agent in clay soil toward California bearing ratio and unconfined compression value	150
<i>Roesyanto, Rudi Iskandar, Ika Puji Hastuty, R. Arrasyid</i>	
Shear behavior of interlocking masonry brick wall portal with the substitution of Mount Sinabung volcanic ash against pushover static load	156
<i>R Karolina, Syahrizal, M A P Handana, P Ramadhan</i>	
Reading the meaning of shophouses facade in Dr Mansur street corridor at Medan City.....	162
<i>D Lindarto, F Eddy, DD Harisdani</i>	
Comparison of road inequality values using roughometer III and roadroid applications.....	169
<i>Medis S Surbakti, Puja Ginting</i>	
Operational performance analysis of trans mebidang bus (case study: Binjai terminal - Medan).....	178
<i>M S Surbakti, M R Bakara</i>	
Green campus concept based on architect perspective.....	185
<i>Hilma Tamiami Fachrudin</i>	
Optimization of garbage transport routes in West Medan using Clarke & Weigh saving and Floyd Warshall algorithm	191
<i>K Syahputri, RM Sari, I Rizkya, J Leviza, M M Tambunan, N Hidayati</i>	
Clustering the vulnerability of traffic accidents in Medan city with fuzzy c-means algorithm.....	196
<i>K Syahputri, R M Sari, I Rizkya, U Tarigan, I Siregar, T A Farhan</i>	

Heritage conservation roadmap for the historic city of Medan, Indonesia	201
<i>Isnen Fitri, Ratna, Amy Marisa, Rudolf Sitorus</i>	
Creation the space for communal learning place in the area between buildings	209
<i>Morida Siagian, Rudolf Sitorus</i>	
Performance spaces in Lumban Silintong area.....	217
<i>M Siagian, R Sitorus</i>	
The ambiguous identity of Lumban Bulbul.....	225
<i>Morida Siagian, Rudolf Sitorus</i>	
Design of heat exchanger (evaporator) type of staggered tube cross-flow as modified evaporator AC-split	234
<i>F. H. Napitupulu, Fellix, H.V. Sihombing</i>	
Effect of choline hydroxide catalyst in the production of methyl ester from crude palm oil	240
<i>R. Manurung, D. K. Syabri, N. G. Bestari, M. D. Anggreawan, Risnaidi, A. G. Siregar</i>	
Application of the delphi method to new renewable energy assessments in power plants in North Sumatra province.....	247
<i>Aulia Ishak, Wan Habibi Rahman Barus</i>	
Effect of sulphuric acid (H ₂ SO ₄) and sodium hydroxide (NaOH) addition to prevent silica scaling in geothermal power plant projection pipes at PLTP X.....	254
<i>B Trisakti, R Sidabutar, A K Lumbangaol, A K Lumbangaol, A Hutagalung, P Lumbangaol, Irvan</i>	
Optimization and design of energy monitoring system in fuels terminal: a case study in North Sumatera province of Indonesia	258
<i>Edy Yurisman, Taufiq Bin Nur, Himsar Ambarita, Adi Putra Simanjuntak, Asril Sitorus</i>	
Experimental of collector box solar water heaters using finned pipes as water flow	266
<i>H Ambarita, Firman W Siahaan, Herdy</i>	
Experimental and numerical simulation of two 20° angled solar collectors with trapezoidal groove plate	272
<i>Adolf Ronny H Sirait, Gery P Hutapea, Himsar Ambarita</i>	
Analysis of energy efficiency in the Krueng Raya TBBM Pertamina building using the energy audit method.....	279
<i>Asril Sitorus, Edy Yurisman, Hendra Susilo, Himsar Ambarita, T B Nur</i>	
Comparison of mass balance and oil quality in plant refinery I and IV	288
<i>Irvan, B Trisakti, R Sidabutar, CW Situmeang, FMR Siregar</i>	
Study of recycle spent brick lining as refractory castable product	293
<i>Kukuh Yudiarto, Taufik Saleh, Ferdy Rahadian, Firman Ashad</i>	
Potential of durian, avocado and jackfruit seed as raw material of bioethanol: a review	299
<i>M H S Ginting, Irvan, E Misran, S Maulina</i>	
Essential oil extraction from citronella grass by microwave-assisted hydro-distillation technique: a preliminary study.....	306
<i>M Sarah, D Estherina</i>	

The utilization of chicken bones as heterogeneous catalyst (CaO) in the production of fatty acid ethyl ester from crude palm oil by using ethanol as solvent.....	312
<i>Mersi Suriani Sinaga, Pontius Pardede, Ermawati</i>	
Production of biodiesel from used cooking oil using blood cockle shell (Anadara Granosa) ash as catalyst.....	318
<i>M S Sinaga, Bernandus Petrus, W G T Sitompul</i>	
Application of converting HSD to LNG.....	326
<i>Muhammad Husnuari</i>	
Study of anaerobic biofilter tofu wastewater treatment with bioball media and phytoremediation by kiambang (salviniamolesta).....	335
<i>Netti Herlina, Annisa Khairani, Safrina Shiddiq</i>	
Biogasoline production via catalytic cracking process using zeolite and zeolite catalyst modified with metals: a review.....	345
<i>Nina Haryani, H. Harahap, Taslim, Irvan</i>	
Triacetin production using SiO ₂ -H ₃ PO ₄ catalysts derived from bamboo leaf biomass waste for esterification reactions of glycerol and acetic acid.....	355
<i>Renita Manurung, Muhammad Dedi Anggreawan, Alwi Gery Siregar</i>	
Effect of recycle ratio on methanogenic anaerobic digestion of palm oil mill effluent (POME) in a stirred tank reactor assisted by ultrafiltration membrane into biogas in transition conditions.....	363
<i>R. Sidabutar, B. Trisakti, A. Husin, Irvan</i>	
Extraction of tannin from garlic skins by using microwave with ethanol as solvent.....	370
<i>C. Pardede, Iriany, R Tambun, M D Fitri, R Husna</i>	
The capability of buoyancy weighing bar method in determining the separation time of biodiesel and glycerol at various concentrations	377
<i>R Tambun, I J Banjarnahor, A N Silaen</i>	
Comparison of solar water heater performance with u curved pipes and straight pipes design using CFD	382
<i>Siwan E. Perangin-Angin, Himsar Ambarita</i>	
Evaluation study of electrical energy usage using prayer models on post payment for electric customers household	388
<i>I Setiono, P Sasmoko, W Heru</i>	
The analysis of occurring process to the deformation and the bending plats from the right hand of the hull plates of LCT Malela Raja III ship for economical management.....	392
<i>SM Tuny</i>	
Biogas production from tofu wastewater substrate using HUASB reactors with addition of trace metal.....	396
<i>Azis Afrizal, Fitri Yandari, Sandi Kurniawan, Nyimas Yanqoritha, Fachrur Razi, Munajat</i>	
Improving the utilization of palm oil mill through fulfillment of fresh fruit bunch	402
<i>Muntashir Masril, Nazaruddin, Juliza Hidayati</i>	
Hydrolysis of oil palm empty fruit bunch using rotating microwave reactor	407
<i>M Sarah, A Fajrina</i>	

Improving the quality of liquid smoke from oil palm fronds through adsorption and distillation processes.....	412
<i>S Maulina, F A Sinaga</i>	
Quality improvement of smoke liquid from oil palm fronds pyrolysis through adsorption - distillation process by using zeolite as adsorbent	419
<i>S Maulina, E R Kamny</i>	
Quality improvement of liquid smoke from oil palm frond pyrolysis through the adsorption-distillation process using activated carbon as adsorbent.....	425
<i>S Maulina, R Amalia</i>	
Waste power plant: waste to energy study in Medan city area.....	431
<i>A Sihite, ST Kasim, F Fahmi</i>	
The effect of car drivers risk perception and driving behaviour towards accident risk: a case study.....	439
<i>Listiani Nurul Huda, Said Ismail</i>	
Degradation of phosphate in laundry waste with biosand filter method.....	447
<i>M S Sinaga, S W Astuti, Elisabeth Gultom</i>	
INALUM environmentally friendly strategy by reusing spent anode (butt) management	453
<i>Dolfy Antonio Sinaga</i>	
Pro-environmental behavior for small medium enterprise: a review.....	459
<i>Arrazy Elba Ridha, Nazaruddin Matondang, Muhammad Haikal Sitepu</i>	
Adsorption interaction model of adsorbents white sand with heavy metals cadmium (Cd ²⁺) naturally.....	467
<i>B Haryanto, FT Saragih, W K Sinaga, M Turmuzi, E Misran</i>	
Planting media with material composition variation of Sinabung sand using mechanic press toll	474
<i>Bode Haryanto, Muhammad Arifin, Rina Bukit, Ahmad Perwira M Tarigan, Eddy Suranta Surbakti</i>	
Alternative study of reducing Carbon Dioxide (CO ₂) from the transportation sector in Medan city	479
<i>I Suryati, BDL Manik, F Syavira, GN Karina, N Herlina, NH Hasibuan, RL Siregar</i>	
Analysis of effect of leadership style, work motivation and work ability to employee satisfaction in increasing performance of harvesters	488
<i>Ahmad Pinayungan Dongoran, Nazaruddin, Rulianda Purnomo Wibowo</i>	
The accident risk of motorcyclist perception and driving behaviour: a case study	498
<i>Listiani Nurul Huda, Indah Puspa Sari Lubis</i>	

PART 2

Coffee bean skin waste extraction for silk dyeing.....	505
<i>Luftinor, Netti Herlina, Ami Santika Kurniati</i>	
Analysis of noise level and dust concentration in the disintegration work station	513
<i>Buchari, Nahdah Fadhillah, Juliza Hidayati, Anizar, Rahmi M Sari</i>	
Adsorption capacity of heavy metal cadmium using white sand as adsorbent.....	524
<i>Bode Haryanto, Michael JC Butarbutar, Tubagus R F. Sinuhaji, Krissandarta Tarigan, Chairina Sinaga</i>	

Effect of various commercial of Na_2SiO_3 on compressive strength of Fly ash-based alkaline activated mortar	530
<i>Otman M. M. Elbasir, M.J.A. Mijarsh, Megat Azmi Megat Johari, Mohamed O. M. Mashri, Rahmi Karolina, Zainal Arifin Ahmad</i>	
The effects of aminopropyltriethoxy silane on tensile and rheometric properties of silica-filled natural rubber vulcanizates	538
<i>I. Surya, H. Ismail</i>	
Rubber fruit shell: agricultural waste material as a potential sustainable production for wastewater treatment	543
<i>Muhammad Naswir, Yasdi, Siti Rahima, Yudha Gusti Wibowo</i>	
Properties of silica reinforced unsaturated polyester composite: The effect of filler content	551
<i>H. Nasution, H. Harahap, S. Pandia, F. Wijaya, M. T. Al Fath</i>	
Extraction of sambung nyawa leaves (<i>Gynura Procumbens</i> [Lour]. Merr) using methanol as solvent	557
<i>Mersi Suriani Sinaga, Putri Defriska Siagian, Shintia Meidindah</i>	
Properties of unsaturated polyester composite filled with cellulose from peanut shell (<i>Arachis hypogea</i> L.): the effect of filler content and compatibilizer addition	564
<i>H Nasution, K Kosasih, Maulida, M T Al Fath</i>	
Utilization of Cocoa (<i>Theobroma cacao</i> L.) pod husk as fillers for bioplastic from Jackfruit (<i>Artocarpus heterophyllus</i>) seed starch with Ethylene Glycol Plasticizer	573
<i>Maulida, Siti Maysarah, Jose</i>	
Development of natural fiber tensile test apparatus using cantilever structure loading system	582
<i>Abubakar, H Homma, H Ambarita</i>	
Effect of preheat and post heat on mechanical properties of 6061 aluminium tungsten inert gas welded joints	591
<i>A Hamsi, T B Sitorus, R K Sinaga</i>	
Acid-treated halloysite nanotubes filled natural rubber composites	598
<i>I Surya, Abdulhakim Masa, H Ismail, N Hayeemasae</i>	
Starch based adhesives made from durian seed through dextrinization	604
<i>Arif Nuryawan, Ridwansyah, Eka Mulya Alamsyah, Ragil Widyorini</i>	
The silica-filled polychloroprene rubber in the addition of alkanolamide: tensile and vulcanization properties	611
<i>I Surya, M Ginting</i>	
Comparison of weight loss in natural rubber latex film (rubber dam) filled nanocrystal cellulose and synthetic dyes with soil burial methods	617
<i>Hamidah Harahap, Yoeselyn Wangi, Toni Chandra, Halimatuddahlia</i>	
Physical and mechanical properties of natural rubber latex film (Rubber Dam) products with filler nanocrystal cellulose from peanut shell (<i>Arachis hypogea</i> L.) and synthetic dyes	623
<i>Toni Chandra, Hamidah Harahap, Yoeselyn Wangi, Halimatuddahlia</i>	
The properties of unfilled natural rubber in the existence of alkanolamide: rheological and crosslink density properties	628
<i>I Surya, Philbert</i>	

The properties of unfilled natural rubber in the existence of alkanolamide: swelling, mechanical and morphological properties	634
<i>I Surya, Philbert</i>	
The nano-sized montmorillonite-filled natural rubber: vulcanization and reinforcement properties	642
<i>I Surya, H Khosman</i>	
Silica-filled styrene-butadiene rubber in the existence of palmitamide: vulcanization properties and reinforcement index	647
<i>I Surya, Edwin</i>	
Design of monitoring and automation systems for greenhouse environment based on IoT	652
<i>Heri, Rian K. Nasution, Billie C. Guptan, Dody K. O. Larosa, Destri Sofhani, Hendrik Siagian, Despaleri Perangin-angin, Eka Dodi Suryanto</i>	
Identification of factors affecting a green industry: a literature review	658
<i>Sophia Aryani Siregar, Humala Napitupulu, Rosnani Ginting</i>	
Application of ranked positional weights method in springbed production line balancing	667
<i>Ikhsan Siregar</i>	
Inventory optimization in the cigarette industry	673
<i>I Siregar</i>	
Design of logistics information system in the finished product warehouse with the waterfall method: review literature	678
<i>Friska Heriyanti, Aulia Ishak</i>	
Minimizing damage of product using six sigma and triz methods	683
<i>Ervi Boangmanalu, Triposa Abigail, Anita Sembiring, Jusra Tampubolon</i>	
Hazard identification of repetitive truck loading activities in mineral water industry	691
<i>Dini Wahyuni, Nismah Panjaitan, Irwan Budiman, Elisa Dora Manurung</i>	
Human error assessment in batik enterprises located in North Sumatera using HEART method	699
<i>Dini Wahyuni, Lamria Theresa Sinaga, Irwan Budiman</i>	
Quality control analysis to reduce defect product and increase production speed using lean six sigma method	705
<i>Khawarita Siregar, Elvira</i>	
Optimization of Sei Mangkei special economic zone (sez) industrial land based on user needs	713
<i>Widoyoko, Nazaruddin, Juliza Hidayati</i>	
Analysis of production line balancing using genetic algorithms	724
<i>Rosnani Ginting, Benedictus Vito Bayu Aji Indi, Alfin Fauzi Malik</i>	
Balancing the production line using the ergonomic approach	728
<i>Rosnani Ginting, Muhammad Khatami, Alfin Fauzi Malik</i>	
Identification of critical part in ripple mill repair design using quality function deployment method	735
<i>Rosnani Ginting, Sawaluddin, Alfin Fauzi Malik</i>	
The analysis of tensile strength and elasticity in slag concrete with curing variations at 90 days age	740
<i>R Karolina, M A P Handana, R Inanda, A D Wiranti</i>	

Iventory policy for multi item products by short expiration period.....	746
<i>A A Nasution, I Rizkya, K Syahpturi, RR Mariana</i>	
Determination of component categories using logic tree analysis.....	753
<i>I Rizkya, I Siregar, K Siregar</i>	
A design of bi-objective optimization model palm refinery export supply chain network: a case study in Indonesia.....	758
<i>Meilita Tryana Sembiring, Saut Sejati Hutapea, M Zaky Hadi, Dini Wahyuni</i>	
Economic analysis of port development project (case study: Belawan Port Medan).....	767
<i>Listiani Nurul Huda, Ratih Sulastrri</i>	
Socio-technical analysis of natural rubber plantation in North Sumatera: possibilities for sustaining supply	776
<i>Muhammad Haikal Sitepu, Alison McKay</i>	
Socio technical analysis of palm oil plantation in North Sumatera Indonesia: making sustainable supply	785
<i>Muhammad Haikal Sitepu, Abdul Rahim Matondang, Meilita Tryana Sembiring, Wadiyah Nur Lubis</i>	
Used tires recycle management and processing: a review.....	793
<i>Muhammad Haikal Sitepu, Armayani, Abdul Rahim Matondang, Meilita Tryana Sembiring</i>	
ERP system implementation with accounting modules in national amil zakat institutions.....	801
<i>Intan Gantira Mira, Muharman Lubis, Warih Puspitasari, Arif Ridho Lubis</i>	
Spare part supplier selection model using decision tree classification techniques: J48 Algorithm.....	808
<i>Aulia Ishak, Tommy Wijaya</i>	
Design of work facilities using quality function deployment (QFD) and macro ergonomic analysis design (MEAD).....	814
<i>M M Tambunan, H L Napitupulu, I Rizkya, K Syahputri</i>	
Reducing waste with the lean manufacturing approach to improve process cycle efficiency	821
<i>Erwin, K Siregar, Anizar, R M Sari, K Syahputri</i>	
Quality control of crude palm oil (CPO) using define, measure, analyze, improve, control (DMAIC) and fuzzy failure mode and effect analysis.....	827
<i>Khawarita Siregar, Aulia Ishak, Heru Andi Sinaga</i>	
Determination of criteria and sub-criteria for selection of spare parts raw material supplier using the Delphi method.....	836
<i>Aulia Ishak, Tommy Wijaya</i>	
Evaluation the effect of supply chain management on firm performance in passion fruit syrup company	840
<i>Kimberly Febrina Kodrat, Sukaria Sinulingga, Humala Napitupulu, Rika Ampuh Hadiguna</i>	
Micro, Small and Medium Enterprise strategy to improve competitiveness in the era of the ASEAN economic community (AEC).....	846
<i>Widya Fernanda Putri, Sukaria Sinulingga, Juliza Hidayati</i>	
Reliability investigation of steam turbine critical components.....	850
<i>M Sabri, Adven Immanuel Sibarani, Faris A M Sabri, H S Geubrina</i>	

Design of warehousing system in order picking process: literature review.....	856
<i>Tiara Melinda, Nazaruddin, Rosnani Ginting</i>	
Simulation process unit bleaching in cooking oil plant using super pro designer version 10.0	863
<i>Irvan, A Suharmanto, R Sidabutar, M Ashari</i>	
The effect of fluxing material and method on the inclusion content of strontium modified A356.2 at Indonesia Asahan Aluminium Company.....	868
<i>Parindra Kusriantoko</i>	
Designing new pot design using Ansys steady state thermal to reach 215 ka pot technology	875
<i>Ardyanta Gabriel Kristian Tarigan</i>	
Calculation of optimal raw material purchase costs using normalized goal programming method	883
<i>MM Tambunan, TS Sinaga, Albert</i>	
The comparative analysis of solar desalination with cooling glass	887
<i>H Ambarita, J P Nababan, William</i>	
Computer simulation of horse shoes made of polymeric composite subjected to external loading	893
<i>Bustami Syam, Maraghi Muttaqin, REK Siregar, Fakhrrur Rozy</i>	
The possibility of smartphone camera to determine iron(III) in solution	900
<i>N Rosyida, L Dinira, E R N Wulandari</i>	
Automated pneumatic vacuum suction robotic arm with computer vision.....	906
<i>J Lim, P Yang, P Yuanda, R V Bakkara, M Sinaga, H Siagian, E D Suryanto, D Perangin-angin</i>	
Balanced scorecard in the integration of corporate strategic planning and performance: a literature review	915
<i>Hanni Alqili Laury, Nazzaruddin Matondang, Meilita Tryana Sembiring</i>	
Comparison between client-side and server-side rendering in the web development	924
<i>Taufan Fadhilah Iskandar, Muharman Lubis, Tien Fabrianti Kusumasari, Arif Ridho Lubis</i>	
Discrete system simulation application on determining the optimal amount of weekly production	930
<i>Humala L Napitupulu</i>	
Study of mobile communication performance by applying empirical models as radio communication channels in two bands.....	938
<i>Maksum Pinem, Muhammad Zulfin</i>	
Modelling analysis of service quality improvement in mobile communications based on hard handover	946
<i>Maksum Pinem, Muhammad Zulfin</i>	
Prototype of wireless sensor network based on open industrial protocol: modbus	955
<i>D Y Tadeus, Yuniarto, T Yuwono</i>	
Design of E-office system in vocational school Diponegoro University using code igniter framework	963
<i>A Subari, S Manan, E Ariyanto</i>	
Engineering education system between Indonesian Vocational School and Japanese KOSEN.....	971
<i>A P Siswanto, Budiyo, H Kasai, S Fujiwara, Y Mizuno</i>	

Implementation of bandwidth management using microtic router	977
<i>I D M Widia</i>	
Whatsapp addiction: dominant factors affecting communication.....	985
<i>A Naryoso, N Lailiyah</i>	
Dashboard information system development as visualization of transaction reports in the application BackInd (backpacker reservation system)	992
<i>Muharman Lubis, Filhan Dennis, Rachmadita Andreswari, Arif Ridho Lubis</i>	
The impact of branding on purchasing decision-making in mall shopping and online shopping.....	998
<i>Aulia Agung Dermawan, Harmein Nasution, Muhammad Haikal Sitepu</i>	
Performance improvement strategies to increase call center service level: a literature review	1007
<i>Johana Sihol Marito Purba, Juliza Hidayati</i>	

Author Index