UNTAR
FACULTY OF
ENGINEERING

ICET
2015

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PROCEEDINGS

2nd International Conference on Engineering of Tarumanagara

"Urban Engineering for Future Generation"

Jakarta, 22-23 October 2015

Auditorium M Building, Campus I,
Tarumanagara University
Jl. Letjen. S. Parman No. 1,
Jakarta 11440 - Indonesia

UNTAR
Universitas Tarumanagara

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(ICET)

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FACULTY OF ENGINEERING
TARUMANAGARA UNIVERSITY
JAKARTA-INDONESIA
2015

FOREWORDS
CHAIRMAN OF THE ORGANIZING COMMITTEE

First of all let's pray and say thanks to God for giving us His mercy and blessings.

The development of technology nowadays is growing up so fast. It aims to meet the necessary of the community to get a better life. Technological innovation which needed to develop technology products that can help people in improving their lives. Therefore the academics are not only required to implement the learning process, but also have to do research and community service to produce innovative scientific research.

Indonesian academics today are eager to involve in research activities. Therefore we required a scientific forum for mutual discussion, exchange information about the research that has been carried out especially related to Urban Engineering.

Faculty of Engineering, University of Tarumanagara conducts the second international conference to bring the academics, researchers to develop their knowledge and exchange ideas so that the researchers can improve the results of research that has been done. The conference called the 2ndInternational Conference on Engineering Tarumanagara, 2015, which is held on the Auditorium at the 8th floor of M Building, Campus I, University of Tarumanagara from 22 to 23 October 2015. The ICET 2015 conference theme is Urban Engineering for Future Generations. Future generations as the frontier of national development should be prepared from now on, along with the necessary infrastructure. The role of technology is to support the enhancement of the ability of future generations. This event includes to the presentation of scientific papers by keynote speakers, parallel sessions presenting papers of academics and research poster exhibition.

The more extensive the information obtained, the more knowledge that we gained. Some papers submitted by researchers and academics from different countries such as, Germany, Malaysia will enrich the science and technological development.

This conference proceedings contain the full text of all papers presented International Conference on Engineering of Tarumanagara 2015. Papers are categorized based on Engineering disciplines set by the organizing committee. Then, the presentation is divided into parallel sessions.

On this occasion I would like to thank to: Foundation of Tarumanagara, Rector of Tarumanagara University, Dean of Faculty of Engineering Tarumanagara University and Sponsors of ICET 2015, for the support and help that has been given. I also would like to thank the authors for their contributions.

Finally I would like to apologies if there are deficiencies in the activity. Thank you for all the attention.

I Wayan Sukania, S.T., M.T.
Chairman of the Organizing Committee

FOREWORDS
DEAN OF FACULTY OF ENGINEERING

I would like to warmly welcome all participants of the 2nd International Conference on Engineering of Tarumanagara (ICET 2015). This conference is organized by Faculty of Engineering, Tarumanagara University. The main aim of this conference was to respond the problem related to urban engineering for future generation. As this conference was designed to gather scientists, engineers, practitioners, and industries in engineering related disciplines, I expect intense discussion will happen among them so that some brilliant ideas to be used to improve the quality of human life can be produced.

I hope this conference will create an international networking and collaborating, especially in engineering research and publication.

I would like to congratulate the organizing committee of ICET 2015, for their outstanding efforts. I would also like to express my gratitude to the sponsors for their contributions in making this conference a resounding success.

I wish the International Conference on Engineering of Tarumanagara (ICET 2015) a very useful and fruitful occasion.

Thank you for your attention and contribution.

Prof. Dr. Agustinus Purna Irawan
Dean of Faculty of Engineering

SCIENTIFIC COMMITTEE

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32.	Prof. Tri Harso Karyono	Tanri Abeng University, Indonesia
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35.	Prof. Chaidir A. Makarim	Tarumanagara University, Indonesia
36.	Prof. Agustinus Purna Irawan	Tarumanagara University, Indonesia
37.	Prof. Leksmono S Putranto	Tarumanagara University, Indonesia
38.	Dr. Adianto	Tarumanagara University, Indonesia
39.	Dr. Agustinus Sutanto	Tarumanagara University, Indonesia
40.	Dr. Danang Priatmodjo	Tarumanagara University, Indonesia
41.	Dr. Naniek Widayati	Tarumanagara University, Indonesia
42.	Dr. Titin Fatima	Tarumanagara University, Indonesia

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ORGANIZING COMMITTEE

Chairman	I Wayan Sukania, S.T., M.T.
Vice Chairman	Imma Sofi Anindyta, S.T., M.Arch.
Conference Secretariat	M. Agung Saryatmo, S.T., M.M. Mekar Sari, S.T., M.Sc. Didi Widya Utama, S.T. M.T.

PROGRAM OVERVIEW

Thursday, 22 October 2015

No	Time	Program
1	08.30-09.00	Registration
2	09.00-09.30	Opening Ceremony
		a) Balinese Welcome Dance
		b) National Anthem + Mars Tarumanagara
		c) Chairman Speech
		d) Opening by Vice Rector of Academics and Student Affairs, Untar
		e) Photo Session (WRA, Dean, Chairman, Keynote Speakers, Presenters, Sponsors)
3	09.30-09.40	Sponsorship Presentation
4	09.40-11.40	Keynote Speaker 1: Prof. Zaidi Mohd. Ripin University Sain Malaysia, Malaysia
		Keynote Speaker 2: Ir. Irwansyah. Industrial Estate Association of Indonesia (Himpunan Kawasan Industri) Head of Environmental and Spatial Planning
5	11.40-11.50	Appreciation to Keynote Speakers, Moderator, Sponsors)
6	11.50-12.00	Sponsorship Presentation
7	12.00-12.10	Technical Information
8	12.10-13.00	Lunch
9	13.00-15.00	Parallel Session I
10	15.00-15.30	Coffee Break
11	15.30-17.00	Parallel Session II

Friday, 23 October 2015

No	Time	Program
1	08.30-09.00	Registration
2	09.00-11.00	Parallel Session III
3	11.00-11.15	Closing Ceremony
4	11.15-12.00	Lunch

TABLE OF CONTENTS

Forewords: Chairman of the Organizing Committee i
Forewords: Dean of Faculty of Engineering ii
Scientific Committee iii
Organizing Committee iv
Program Overview v
Table of Contents vi
Parallel Session Schedules xii

Invited Papers

Development of Low Frequency Electromagnetic Vibration Energy Harvester *Wan Masrurah Hairudin, M. Izudin Alisah, Chan Ping Yi, Tan Yee Hern, Zaidi Mohd Ripin*	1-8

List of Papers - Architecture

Paper ID	Title Author/Authors	pp
AE-01	Catholic Church: Influence of Liturgical Ritual in the Building Design (Studied on Four Catholic Churches in DKI Jakarta Area) *Rudy Trisno, Sugiri Kustedja*	1
AE-02	Performance Analysis in Home Industry Scale Production of Modified Traditional Brick as Green Building Material With Reed as Filler *Kurniati Ornam, Masykur Kimsan, La Ode Ngkoimani*	1-8
AE-03	The Study of Defense Space on Chinatown Petak Sembilan, West Jakarta *Nafi'ah Solikhah*	1
AE-04	Survey on the Fulfillment of the Construction Requirements for Non-Engineered Houses in North Sumatra *Darwin*	1
AE-05	Reveal Knowledge Pacitan Rural Java Architecture *Triyuniastuti, HB Satrio Wibowo, Sukirman*	1
AE-06	Uniqueness Omah Dudur Dawa Architecture *Satrio HB Wibowo, Sudaryono, E. Pradipto*	1
AE-07	Global and Local, at the Same Time *Franky Liauw*	1
AE-08	Conducting Smart Programs in the Old Kampoeng Beyond the Modern Era City of Surabaya *Danny Santoso Mintorogo Wanda K. Widigdo, Liliany S. Arifin, Anik Yuniwati*	1
AE-09	Adaptation to Climate Change as the Controller of Disaster Vulnerability in Coastal Settlements in Mempawah Hilir, West Kalimantan *Ely Nurhidayati*	1
AE-10	Study of Staircases Design and Visitors' Perception at Commercial Building *Siti Belinda Amri, Santi, La Ode Abdul Syukur, Aspin*	1-8

Paper ID	Title Author/Authors	pp
AE-11	Greenship Rating of Wood Materials in Building *James Rilatupa*	1-9
AE-12	Study of Bioclimatic Application to the Spatial Habitation Along the River Bank Ciliwung *Handajani Asriningpuri, Ratih Budiarti, Harlisa*	1-8
AE-13	Public Engagement in Public Space as the Elements of City Branding *Olga Nauli Komala*	1
AE-14	Bornean Long House: Cosmological Value in Socio-Cultural Transformation Stream *Klara Puspa Indrawati*	1-10
AE-15	Potential Tour Toward Village of Cultural Conservation of Baluwerti, Surakarta, Jawa Tengah, Indonesia *Naniek Widayati Priyomarsono*	1-10

List of Papers - Civil Engineering

Paper ID	Title/Author/Authors	pp
CE-01	The Understanding and the Use of Motorcycle Special Stopping Space in Signalized Intersection *Leksmono Suryo Putranto, Minggaza Suhindra*	1-5
CE-02	Identification of Volcanic Rocks in Imogiri Yogyakarta Based on Subsurface Geologic Data *Winarti, Hill Gendoet Hartono*	1-9
CE-03	Model Test of Influence Groundwater Pumping to Decrease Surface of the Land *Nurnawaty, M. Selintung, M.Arsyad Thaha, F. Marikar*	1-5
CE-04	Analysis on the Needs of Bike Share in Institut Teknologi Sepuluh Nopember Surabaya *Siera Rozanah, Ervina Ahyudanari*	1
CE-05	Flexural Behavior of Bamboo Reinforced Concrete Beams *Ika Bali, Erianto Wijaya*	1-6
CE-06	Identification of Hazardous Road Sections Using Over Dispersion-Excess Zero Data of Vehicle Accident at Johor Federal Roads *Joewono Prasetijo, W Zahidah Musa, Zaffan Farhana Zainal*	1-6
CE-07	Speed Profile Based on Design Consistency *Joewono Prasetijo, Zaffan Farhana Zainal, W. Zahidah Musa*	1-6
CE-08	DAB as an Effective Dispute Resolution in Construction Industry *Purnomo*	1
CE-09	Analysis Energy Consumption and Price of Fuel Truck in Makassar *Mukhtar Lutfie, Lawalenna Samang, Sakti Adji Adisasmita, Isran Ramli*	1-9
CE-10	Influence of Economic External Factors on Construction Project Duration Identification *Basuki Anondho, Yusi Yusianto, Jemmy Wijaya*	1-6
CE-11	Analysis of the Influence of Longitudinal Beam Toward the Concrete's Nominal Shear Strength *Daniel Christianto, Fannywati Itang, Widodo Kushartomo, and Irene Natasha Kosasih*	1-6

Paper ID	Title/Author/Authors	pp
CE-12	Stabilization of Marine Dredged Sediment With Hydraulic Binders and Silica Fume *Ernesto Silitonga*	1

List of Papers - Electrical Engineering

Paper ID	Title/Author/Authors	pp
EE-01	Sentiment Classification for Academic Questionnaire Using NBC and SVM *Amir Hamzah, Naniek Widyastuti*	1-8
EE-02	GUI Applications on Ground Segment Research Rockets *Imam Sampurno Nugroho, Yahan Nuryad, Nanniek Andiani, Yohannes Dewanto*	1
EE-03	Document Subjectivity and Target Detection in Opinion Mining Using HMM Pos-Tagger *Amir Hamzah, Naniek Widyastuti*	1
EE-04	Analysis, Simulation and Implementation of Linear Block Codes Using a Microcontroller *Joni Fat*	1-7
EE-05	Visual Performance of Tunnel Lighting Along the Jakarta Outer Ring Road *Endah Setyaningsih, Jeanny Pragantha*	1-8
EE-06	Microcontroller Based Speed Controller of One Phase Induction AC Motor in Escalators *Hadian Satria Utama, Edward Naulibasa Lie, Pono Budi Marjoko*	1-8
EE-07	Implementation Hadoop on Private IaaS Cloud Computing *Edy Kristianto*	1-6

List of Papers - Industrial Engineering

Paper ID	Title/Author/Authors	pp
IE-01	Rapid Tooling Manufacturability Advanced Materials Using Automation Fuzzy-AHP Method for Injection Gyro-Magnetic Hot Mold *Moh. Hardiyanto*	1-6
IE-02	Workload Analysis of Manually Operator at Clean and Tidy Car Wash *Indra Surianto, I Wayan Sukania and Lamto Widodo*	1-10
IE-03	Designing a "Voice of Customer" Program to Support Knowledge-Based-QFD *Ronald Sukwadi, Mokh. Suef, Enny Widawati, Cynthia Giovany*	1-8
IE-04	The Strategy for Improving the Quality of Printing Film Production at PT X *Lithrone Laricha S, Delvis Agusman, Lucky*	1-8
IE-05	Research Comparison Among Business Incubator Research Sample and Analysis in the World *Lina Gozali, Maslin Masrom, Habibah @ Norehan Haron, Teuku Yuri M. Zagloel*	1-7

Paper ID	Title/Author/Authors	pp
IE-06	Developing Algoritm to Design Jig & Fixture in SME Supporting Industry Based on Quality Function Deployment Methods (Case Study: Design Assy Machine and Leakage Testing Machine for Air Brake Coupling Hose) *Cucu Wahyudin, Aan Mintarsih*	1-7
IE-07	Comparison of Modular Layout and Distributed Layout Using Simulation Approach *Trifenaus Prabu Hidayat, Andre Sugioko*	1-8
IE-08	Optimization Replacement Schedule of Chisels Based on Quality Cost With Exponentially Increasing Failure Rate *Dadang Arifin*	1-6
IE-09	Re-Design The High of Handlebar on Semarang's Bus Rapid Transit Using Anthropometry and Ergonomy Approach *Annissa Lutfiah Hatuwe, Annisa Nindya Putri, Hanung Kurniawan, Reza Prisman*	1-6
IE-10	Optimization of Production Planning Using Goal Programming Method (Study in a Cement Plant) *Syamsul Anwar, Lonny Afrizalmi*	1
IE-11	Risk Assessment of Distal Upper Extremity by Strain Index Method in a Small Shoes-Making Industry *Syamsul Anwar, Yuri Fandi Tanjung*	1
IE-12	The Effect of Working Environment Conditions on Employees' Job Satisfaction in a Palm Oil Industry *Elsa Febriani, Musdirwan, Syamsul Anwar*	1
IE-13	Improvement of Service Performance in PO. Sandy Putra by Implementation of Safety Management System for Public Transport *Hanung Kurniawan*	1-7
IE-14	Designing a Closed Loop Tutelage System to Support Student in Preparing and Executing the Study Plan *Andrijanto*	1-8
IE-15	Design of Eco-Friendly Dairy Farm Business Plan Using Business Canvas Model *Meity Martaleo, William Bobby Susanto, Marcellia Susan*	1
IE-16	Heuristic Model With Discritized Time Horizon for Solving Alternative Machine Scheduling Problem on Single Operation *Irwan Sukendar*	1-6
IE-17	Simulator of Pitot Tube, Using The Sensor MPX5100 in an Aircraft Model *Joko Sugiarto, Dwijati, Hendardi, Yohannes Dewanto*	
IE-18	Ergonomic Aspect of Physical Environment in Junior High School (Between Individual Comfort and Saving Energy Behavior) *Lamto Widodo, Fransisca Iriani, Endah Setyaningsih*	1-12
IE-19	Embodiment Design of High Capacity Mixer (Case Study : Steamed Sponge Cake Production at "M" Home Industry) *Adrian Christiady, Vivi Triyanti*	1-9
IE-20	The Comparison of MTM-1 and MOST in Predicting Work Element Time *Ivana Theresia Libardus, Vivi Triyanti*	1-8

List of Papers - Mechanical Engineering

Paper ID	Title/Author/Authors	pp
ME-01	Study of the Phenomenon of Collapse and Buckling the Car Body Frame *Didik Sugiyanto, Audri Deacy Cappeberg*	1
ME-02	Model Reduction Methods for Cracked Rotor Dynamics Analysis *Rugerri Toni Liong*	1-8
ME-03	Design and Construction of a Prototype of Screw Press for the Collection of Coconut Milk *I Wayan Surata, Tjokorda Gde Tirta Nindhia, Davied Budyanto, Ahmad Eko Yulianto*	1-6
ME-04	Assessment of Outside Air Supply for Split AC System. Part B: Experiment *K. D. Putra, A. Bimaridi, E. Djunaedy*	1
ME-05	Assessment of Outside Air Supply for Split AC System. Part A: Affordable Instrumentation *A. Bimaridi, K. D. Putra, E. Djunaedy*	1
ME-06	Analysis Energy Usage and OTTV in the University Building *Suci, Ery Djunaedy, M. Ramdlan Kirom*	1
ME-07	Effect of Tool Nose Radius on Surface Roughness for Machining ST 60 Steel Using Carbide Inserts *Sobron Lubis, Erwin Siahaan, Teguh Imam Suyatno*	1-7
ME-08	Design Can Cover for Feeding Conveyor for Closing Cans in Cans Machine Maker *Gusti Ryandi Arief, Agung, Wina Libyawati, Yohannes Dewanto*	1
ME-09	Design of Cessna Aircraft Model JD - 010 Use Scale 8:1 Based Radio Control *Muhammad Ahda, Ahmad Ilham Firdaus, Erick H.K., Yohannes Dewanto*	1
ME-10	Magnet for Generate Electric Power Applications *Dzulfi S Prihartanto, Alva Abdul Ganis, I.G.Eka Lesmana*	1
ME-11	Dynamic Analysis on Conditions For Stay off Airfoil, Flying and Landing *Bismil Rebetta, Aprilia Sakti, Erick H.K.*	1
ME-12	Simulation of Non-Newtonian Fluid Flow Through Encapsulation of 3-Dimensional Stacked Flip-Chip Package Using Lattice Boltzmann Method *M.H.H. Ishak, M.Z. Abdullah, Aizat Abas, M.I. Ismail, M.S. Mohamad*	1-6
ME-13	Cyclone Turbine Ventilator as a Power Source Lamps for Home Lighthing *Jenny Delly, Welly Liku Padang, Baso Mursidi, Budiman Sudia*	1-9
ME-14	Finite Element Analysis of Modified In-Wheel Electric Motor for Hybrid Electric Motorcycle *Didi Widya Utama*	1-6
ME-15	Pathological Tremor Measurement and Reproduction *Ping Yi Chan, Zaidi Mohd Ripin*	1-8
ME-16	FSI Analysis on the Effect of Membrane Rigidity on Laminar Flow Separation Over NACA 64_3-218 Airfoil *M.S. Abdul Aziz, M.Z. Abdullah, S.M. Firdaus, H. Yusoff, K.A. Ahmad, M. Zubair*	1-8

Paper ID	Title/Author/Authors	pp
ME-17	Analysis Ethyl Ester in Biodiesel of Raw Material Waste Coconut Oil and Arak *I Wayan Bandem Adnyana, Ni Made Suaniti*	1-4
ME-18	Design and Development of Quadcopter Prototype *Riyan Fenaldo Alphonso, Agustinus Purna Irawan, Frans Jusuf Daywin*	1-7
ME-19	Experimental Investigation on Electronic Cooling Performance Using Porous Medium Heat Sink *Muhammad Zaakir Angsoommuddin, Mohd Zulkifly Abdullah, Third Author*	1-6
ME-20	Tensile Strength Polymer Matrix Composite With Reinforcement Gigantochloa Apus *Sofyan Djamil, Mohamed Azlan Suhot, Mohd Zaki Hasan*	1-7
ME-21	Effectivity of Heat Exchanger Using Coolant Fluid *Harto Tanujaya*	1-4
ME-22	Alitizing Process of Low Alloy Steel Emergency Doors in High Rise Building *Erwin Siahaan*	1-8

List of Papers - Urban Engineering

Paper ID	Title/Author/Authors	pp
UE-01	Decision Design Support System of Urban Landscape Planning Using 3D Interactive Visualization *Herry Santosa, Shinji Ikaruga, Takeshi Kobayashi*	1
UE-02	Sustainability Level of Settlement in Gajah Wong Riverside Area, Kotagede, Yogyakarta *Abraham Bhaskara Singgih*	1
UE-03	Urban Sprawl Effect to Sustainable City *Andas Budy*	1-3
UE-04	Arrangement Model on the Sustainable Coastal Settlement in Makassar *Naidah Naing, Asdar Djamereng, Bulgis*	1-8
UE-05	Implementation for Optimizing the Turnkey Project Scheme in Highrise Buiding/Flat Development Base on Duration and Interest Rate *Sylvie Wirawati, Ricky Pittra Halim*	1-13
UE-06	Spatial Articulation and Coexistence of Mode of Production in the Dynamics of Development at the Urban Fringe of Makassar City *Batara Surya*	1-11

PARALLEL SESSION SCHEDULE
22 October 2015

ROOM : 1
MODERATOR : Klara Puspa Indrawati, S.T., M.Ars.
SESSION : 1

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	AE-02	Performance Analysis in Home Industry Scale Production of Modified Traditional Brick as Green Building Material With Reed as Filler *Kurniati Ornam, Masykur Kimsan, La Ode Ngkoimani*
2	13.15-13.30	AE-10	Study of Staircases Design and Visitors' Perception at Commercial Building *Siti Belinda Amri, Santi, La Ode Abdul Syukur, Aspin*
3	13.30-13.45	AE-11	Greenship Rating of Wood Materials in Building *James Rilatupa*
4	13.45-14.00	AE-12	Study of Bioclimatic Application to the Spatial Habitation Along the River Bank Ciliwung *Handajani Asriningpuri, Ratih Budiarti, Harlisa*
5	14.00-14.15	AE-14	Bornean Long House: Cosmological Value in Socio-Cultural Transformation Stream *Klara Puspa Indrawati*
6	14.15-14.30	AE-15	Potential Tour Toward Village of Cultural Conservation of Baluwerti, Surakarta, Jawa Tengah, Indonesia *Naniek Widayati Priyomarsono*
7	14.30-14.45	UE-03	Urban Sprawl Effect to Sustainable City *Andas Budy*
8	14.45-15.00	UE-04	Arrangement Model on the Sustainable Coastal Settlement in Makassar *Naidah Naing, Asdar Djamereng, Bulgis*

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PARALLEL SESSION SCHEDULE
22 October 2015

ROOM : 1
MODERATOR : Ir. Hadian Satria Utama, MSEE
SESSION : 2

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	UE-05	Implementation for Optimizing the Turnkey Project Scheme in Highrise Buiding/Flat Development Base on Duration and Interest Rate *Sylvie Wirawati, Ricky Pittra Halim*
2	13.15-13.30	UE-06	Spatial Articulation and Coexistence of Mode of Production in the Dynamics of Development at the Urban Fringe of Makassar City *Batara Surya*
3	13.30-13.45	EE-01	Sentiment Classification for Academic Questionnaire Using NBC and SVM *Amir Hamzah, Naniek Widyastuti*
4	13.45-14.00	EE-04	Analysis, Simulation and Implementation of Linear Block Codes Using a Microcontroller *Joni Fat*
5	14.00-14.15	EE-05	Visual Performance of Tunnel Lighting Along the Jakarta Outer Ring Road *Endah Setyaningsih, Jeanny Pragantha*
6	14.15-14.30	EE-06	Microcontroller Based Speed Controller of One Phase Induction AC Motor in Escalators *Hadian Satria Utama, Edward Naulibasa Lie, Pono Budi Marjoko*
7	14.30-14.45	EE-07	Implementation Hadoop on Private IaaS Cloud Computing *Edy Kristianto*

PARALLEL SESSION SCHEDULE
22 October 2015

ROOM : 2
MODERATOR : Dr. Widodo Kushartomo, S.Si., M.Si.
SESSION : 1

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	CE-01	The Understanding and the Use of Motorcycle Special Stopping Space in Signalized Intersection *Leksmono Suryo Putranto, Minggaza Suhindra*
2	13.15-13.30	CE-02	Identification of Volcanic Rocks in Imogiri Yogyakarta Based on Subsurface Geologic Data *Winarti, Hill Gendoet Hartono*
3	13.30-13.45	CE-03	Model Test of Influence Groundwater Pumping to Decrease Surface of the Land *Nurnawaty, M. Selintung, M.Arsyad Thaha, F. Marikar*
4	13.45-14.00	CE-05	Flexural Behavior of Bamboo Reinforced Concrete Beams *Ika Bali, Erianto Wijaya*
5	14.00-14.15	CE-06	Identification of Hazardous Road Sections Using Over Dispersion-Excess Zero Data of Vehicle Accident at Johor Federal Roads *Joewono Prasetijo, W Zahidah Musa, Zaffan Farhana Zainal*
6	14.15-14.30	CE-07	Speed Profile Based on Design Consistency *Joewono Prasetijo, Zaffan Farhana Zainal, W. Zahidah Musa*
7	14.30-14.45	CE-09	Analysis Energy Consumption and Price of Fuel Truck in Makassar *Mukhtar Lutfie, Lawalenna Samang, Sakti Adji Adisasmita, Isran Ramli*
8	14.45-15.00	CE-11	Analysis of the Influence of Longitudinal Beam Toward the Concrete's Nominal Shear Strength *Daniel Christianto, Fannywati Itang, Widodo Kushartomo, and Irene Natasha Kosasih*

PARALLEL SESSION SCHEDULE
22 October 2015

ROOM : 2
MODERATOR : Dr. Ir. M. Sobron Yamin Lubis, M.Sc
SESSION : 2

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	ME-02	Model Reduction Methods for Cracked Rotor Dynamics Analysis *Rugerri Toni Liong*
2	13.15-13.30	ME-12	Simulation of Non-Newtonian Fluid Flow Through Encapsulation of 3-Dimensional Stacked Flip-Chip Package Using Lattice Boltzmann Method *M.H.H. Ishak, M.Z. Abdullah, Aizat Abas, M.I. Ismail, M.S. Mohamad*
3	13.30-13.45	ME-13	Cyclone Turbine Ventilator as a Power Source Lamps for Home Lighthing *Jenny Delly, Welly Liku Padang, Baso Mursidi, Budiman Sudia*
4	13.45-14.00	ME-15	Pathological Tremor Measurement and Reproduction *Ping Yi Chan, Zaidi Mohd Ripin*
5	14.00-14.15	ME-07	Effect of Tool Nose Radius on Surface Roughness for Machining ST 60 Steel Using Carbide Inserts *Sobron Lubis, Erwin Siahaan, Teguh Imam Suyatno*
6	14.15-14.30	ME-16	FSI Analysis on the Effect of Membrane Rigidity on Laminar Flow Separation Over NACA 64_3-218 Airfoil *M.S. Abdul Aziz, M.Z. Abdullah, S.M. Firdaus, H. Yusoff, K.A. Ahmad, M. Zubair*
7	14.30-14.45	ME-19	Experimental Investigation on Electronic Cooling Performance Using Porous Medium Heat Sink *Muhammad Zaakir Angsoommuddin, Mohd Zulkifly Abdullah, Third Author*
8	14.45-15.00	ME-20	Tensile Strength Polymer Matrix Composite With Reinforcement Gigantochloa Apus *Sofyan Djamil, Mohamed Azlan Suhot, Mohd Zaki Hasan*

PARALLEL SESSION SCHEDULE
22 October 2015

ROOM : 3
MODERATOR : Dr. Lamto Widodo, S.T., M.T.
SESSION : 1

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	IE-01	Rapid Tooling Manufacturability Advanced Materials Using Automation Fuzzy-AHP Method for Injection Gyro-Magnetic Hot Mold *Moh. Hardiyanto*
2	13.15-13.30	IE-03	Designing a "Voice of Customer" Program to Support Knowledge-Based-QFD *Ronald Sukwadi, Mokh. Suef, Enny Widawati, Cynthia Giovany*
3	13.30-13.45	IE-06	Developing Algoritm to Design Jig & Fixture in SME Supporting Industry Based on Quality Function Deployment Methods (Case Study: Design Assy Machine and Leakage Testing Machine for Air Brake Coupling Hose) *Cucu Wahyudin, Aan Mintarsih*
4	13.45-14.00	IE-07	Comparison of Modular Layout and Distributed Layout Using Simulation Approach *Trifenaus Prabu Hidayat, Andre Sugioko*
5	14.00-14.15	IE-08	Optimization Replacement Schedule of Chisels Based on Quality Cost With Exponentially Increasing Failure Rate *Dadang Arifin*
6	14.15-14.30	IE-09	Re-Design The High of Handlebar on Semarang's Bus Rapid Transit Using Anthropometry and Ergonomy Approach *Annissa Lutfiah Hatuwe, Annisa Nindya Putri, Hanung Kurniawan, Reza Prisman*
7	14.30-14.45	IE-13	Improvement of Service Performance in PO. Sandy Putra by Implementation of Safety Management System for Public Transport *Hanung Kurniawan*
8	14.45-15.00	IE-14	Designing a Closed Loop Tutelage System to Support Student in Preparing and Executing the Study Plan *Andrijanto*

PARALLEL SESSION SCHEDULE
22 October 2015

ROOM : 3
MODERATOR : Harto Tanujaya, S.T., M.T., Ph.D.
SESSION : 2

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	IE-16	Heuristic Model With Discritized Time Horizon for Solving Alternative Machine Scheduling Problem on Single Operation *Irwan Sukendar*
2	13.15-13.30	IE-19	Embodiment Design of High Capacity Mixer (Case Study: Steamed Sponge Cake Production at "M" Home Industry) *Adrian Christiady, Vivi Triyanti*
3	13.30-13.45	IE-20	The Comparison of MTM-1 and MOST in Predicting Work Element Time *Ivana Theresia Libardus, Vivi Triyanti*
4	13.45-14.00	ME-04	Assessment of Outside Air Supply for Split AC System. Part B: Experiment *K. D. Putra, A. Bimaridi, E. Djunaedy*
5	14.00-14.15	ME-05	Assessment of Outside Air Supply for Split AC System. Part A: Affordable Instrumentation *A. Bimaridi, K. D. Putra, E. Djunaedy*
6	14.15-14.30	ME-03	Design and Construction of a Prototype of Screw Press for the Collection of Coconut Milk *I Wayan Surata, Tjokorda Gde Tirta Nindhia, Davied Budyanto, Ahmad Eko Yulianto*
7	14.30-14.45	ME-14	Finite Element Analysis of Modified In-Wheel Electric Motor for Hybrid Electric Motorcycle *Didi Widya Utama*
8	14.45-15.00	ME-17	Analysis Ethyl Ester in Biodiesel of Raw Material Waste Coconut Oil and Arak *I Wayan Bandem Adnyana, Ni Made Suaniti*
9	15.00-15.15	ME-18	Design and Development of Quadcopter Prototype *Riyan Fenaldo Alphonso, Agustinus Purna Irawan, Frans Jusuf Daywin*
10	15.15-15.30	ME-21	Effectivity of Heat Exchanger Using Coolant Fluid *Harto Tanujaya*

PARALLEL SESSION SCHEDULE
23 October 2015

ROOM : 1
MODERATOR : Mekar Sari, S.T., M.Sc.
SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	AE-01	Catholic Church: Influence of Liturgical Ritual in the Building Design (Studied on Four Catholic Churches in DKI Jakarta Area) *Rudy Trisno, Sugiri Kustedja*
2	09.15-09.30	AE-03	The Study of Defense Space on Chinatown Petak Sembilan, West Jakarta *Nafi'ah Solikhah*
3	09.30-09.45	AE-04	Survey on the Fulfillment of the Construction Requirements for Non-Engineered Houses in North Sumatra *Darwin*
4	09.45-10.00	AE-05	Reveal Knowledge Pacitan Rural Java Architecture *Triyuniastuti, HB Satrio Wibowo, Sukirman*
5	10.00-10.15	AE-06	Uniqueness Omah Dudur Dawa Architecture *Satrio HB Wibowo, Sudaryono, E. Pradipto*
6	10.15-10.30	AE-07	Global and Local, at the Same Time *Franky Liauw*
7	10.30-10.45	AE-08	Conducting Smart Programs in the Old Kampoeng Beyond the Modern Era City of Surabaya *Danny Santoso Mintorogo Wanda K. Widigdo, Liliany S. Arifin, Anik Yuniwati*
8	10.45-11.00	AE-09	Adaptation to Climate Change as the Controller of Disaster Vulnerability in Coastal Settlements in Mempawah Hilir, West Kalimantan *Ely Nurhidayati*
9	11.00-11.15	AE-13	Public Engagement in Public Space as the Elements of City Branding *Olga Nauli Komala*

PARALLEL SESSION SCHEDULE
23 October 2015

ROOM : 2
MODERATOR : Ir. Sofyan Djamil, M.Sc
SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	CE-10	Influence of Economic External Factors on Construction Project Duration Identification *Basuki Anondho, Yusi Yusianto, Jemmy Wijaya*
2	09.15-09.30	ME-06	Analysis Energy Usage and OTTV in the University Building *Suci, Ery Djunaedy, M. Ramdlan Kirom*
3	09.30-09.45	ME-08	Design Can Cover for Feeding Conveyor for Closing Cans in Cans Machine Maker *Gusti Ryandi Arief, Agung, Wina Libyawati, Yohannes Dewanto*
4	09.45-10.00	ME-09	Design of Cessna Aircraft Model JD - 010 Use Scale 8:1 Based Radio Control *Muhammad Ahda, Ahmad Ilham Firdaus, Erick H.K., Yohannes Dewanto*
5	10.00-10.15	ME-10	Magnet for Generate Electric Power Applications *Dzulfi S Prihartanto, Alva Abdul Ganis, I.G.Eka Lesmana*
6	10.15-10.30	ME-11	Dynamic Analysis on Conditions For Stay off Airfoil, Flying and Landing *Bismil Rebetta, Aprilia Sakti, Erick H.K.*
7	10.30-10.45	ME-01	Study of the Phenomenon of Collapse and Buckling the Car Body Frame *Didik Sugiyanto, Audri Deacy Cappeberg*
8	10.45-11.00	ME-22	Alitizing Process of Low Alloy Steel Emergency Doors in High Rise Building *Erwin Siahaan*

PARALLEL SESSION SCHEDULE
23 October 2015

ROOM : 3
MODERATOR : M. Agung Saryatmo, S.T., M.M.
SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	IE-02	Workload Analysis of Manually Operator at Clean and Tidy Car Wash *Indra Surianto, I Wayan Sukania and Lamto Widodo*
2	09.15-09.30	IE-04	The Strategy for Improving the Quality of Printing Film Production at PT X *Lithrone Laricha S, Delvis Agusman, Lucky*
3	09.30-09.45	IE-05	Research Comparison Among Business Incubator Research Sample and Analysis in the World *Lina Gozali, Maslin Masrom, Habibah @ Norehan Haron, Teuku Yuri M. Zagloel*
4	09.45-10.00	IE-10	Optimization of Production Planning Using Goal Programming Method (Study in a Cement Plant) *Syamsul Anwar, Lonny Afrizalmi*
5	10.00-10.15	IE-11	Risk Assessment of Distal Upper Extremity by Strain Index Method in a Small Shoes-Making Industry *Syamsul Anwar, Yuri Fandi Tanjung*
6	10.15-10.30	IE-12	The Effect of Working Environment Conditions on Employees' Job Satisfaction in a Palm Oil Industry *Elsa Febriani, Musdirwan, Syamsul Anwar*
7	10.30-10.45	IE-15	Design of Eco-Friendly Dairy Farm Business Plan Using Business Canvas Model *Meity Martaleo, William Bobby Susanto, Marcellia Susan*
8	10.45-11.00	IE-17	Simulator of Pitot Tube, Using The Sensor MPX5100 in an Aircraft Model *Joko Sugiarto, Dwijati, Hendardi, Yohannes Dewanto*
9	11.00-11.15	IE-18	Ergonomic Aspect of Physical Environment in Junior High School (Between Individual Comfort and Saving Energy Behavior) *Lamto Widodo, Fransisca Iriani, Endah Setyaningsih*

PARALLEL SESSION SCHEDULE
23 October 2015

ROOM : 4
MODERATOR : I Wayan Sukania, S.T., M.T.
SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	UE-01	Decision Design Support System of Urban Landscape Planning Using 3D Interactive Visualization *Herry Santosa, Shinji Ikaruga, Takeshi Kobayashi*
2	09.15-09.30	UE-02	Sustainability Level of Settlement in Gajah Wong Riverside Area, Kotagede, Yogyakarta *Abraham Bhaskara Singgih*
3	09.30-09.45	CE-04	Analysis on the Needs of Bike Share in Institut Teknologi Sepuluh Nopember Surabaya *Siera Rozanah, Ervina Ahyudanari*
4	09.45-10.00	CE-08	DAB as an Effective Dispute Resolution in Construction Industry *Purnomo*
5	10.00-10.15	CE-12	Stabilization of Marine Dredged Sediment With Hydraulic Binders and Silica Fume *Ernesto Silitonga*
6	10.15-10.30	EE-02	GUI Applications on Ground Segment Research Rockets *Imam Sampurno Nugroho, Yahan Nuryad, Nanniek Andiani, Yohannes Dewanto*
7	10.30-10.45	EE-03	Document Subjectivity and Target Detection in Opinion Mining Using HMM Pos-Tagger *Amir Hamzah, Naniek Widyastuti*

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DESIGNING A CLOSED LOOP TUTELAGE SYSTEM TO SUPPORT STUDENT IN PREPARING AND EXECUTING THE STUDY PLAN

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Abstract

The tutelage system helps student preparing the study plan in a semester. The system is designed with sustainable discussion with supervisor for getting advice about their study. The number of discussion per semester is different for each department, faculty, or university. The aim of sustainable discussion is to support student execute their study plan in process. The system expects the student awareness will bring them to the discussion with supervisor when the study problem occurring, but generally students are trying to ignore it. Although they obey to come in the meeting, they hesitate to discuss their problem. That condition suspect the tutelage system is not optimal to ensure the student study plan will be finished with the good result. The investigation of student will pass the courses in a semester will be done. A close loop tutelage system will be designed; the system will be equipped with a sensor that can help supervisor to identify a certain students that facing a problem in study. The sensor also helps student to monitor and predict the future score that must be achieved to fulfill the expected result.

Keywords: closed loop, system approach, system model, tutelage

INTRODUCTION

The activity of university student study in semester can be described as an open system because environment influences the element of study process, in this case the student it self[1.] the degree of interaction may vary and can produce uncontrolled result. A system contains input, process, and output as shown in figure 1, the input is the subject will be selected by student, the process of study is a course in progress, it is assumed as a black box because each student has a different capability and characteristic in study. Output will be the final result of each course at the end of semester. How good the study process is, usually be measured by the final score of each course. Environment will be friends, parents, teachers or relatives.

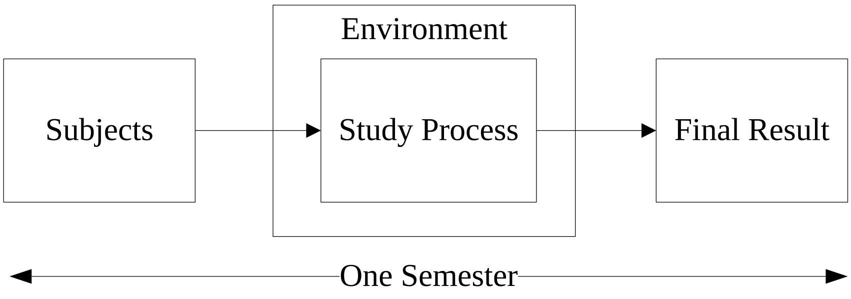

Figure 1. System of Study

A tutelage system is a system of study added by tutelage process and also can be described as an open system[1][2]. wherein the system element still has an interaction with their environment. The input of tutelage system is same as the system of study. A tutelage process is designed to control the process of study, in order to help student achieve their target by responding a feedback control before final result is attained.

The tutelage process is a discussion time; supervisor gives advices about student study plan. After student got advices from the supervisor they will be in motivated, but no specific goal resulted at the end of process. Although the student can bring the study problem in the meeting with the supervisor anytime but almost student ignore its function. The final result is student may pass the course, in sufficient result or good result or maybe fail in course. In this case a sustain tutelage that is expected can help student doesn't work well. The tutelage system model can be seen in figure 2.

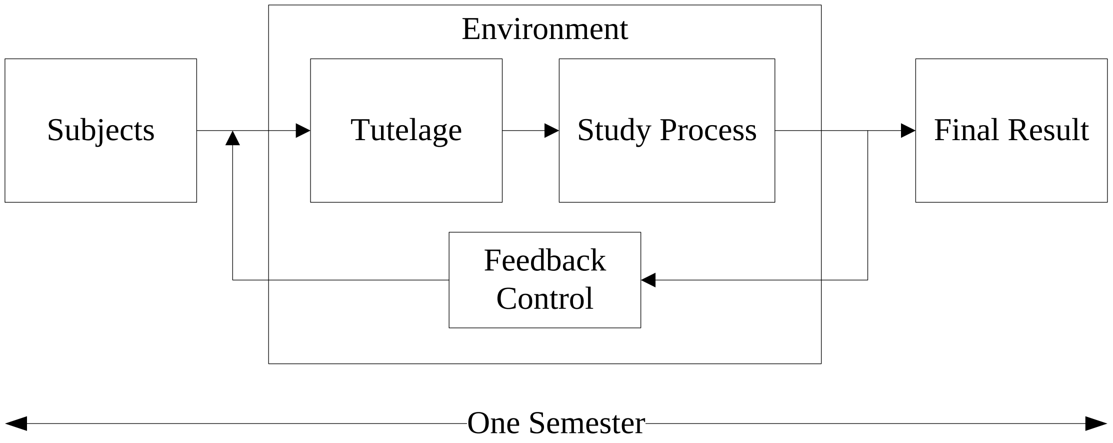

Figure 2. Tutelage System

In this research, a close loop system will be designed to equip the tutelage system for controlling the process result before the final result is attained. The system model will be simulated on 33 students in basic calculus class at short semester and the calculation will be done by SOLVER. The result will show the close loop system can be used to detect the error in output.

MATERIALS AND METHOD

In system approach theory, a tutelage system can be viewed as a purposeful system. Russell L. Ackoff 1971 said that the purposeful system is the system which can change its goals under constant conditions; its selects ends as well as means and thus displays will[1]. Student as element in the tutelage system has an objective to graduate in the specific length of period, it can be said that objective is an ideal condition which may be obtained at the end of study period[1]. They also have goals to be pursued in each semester by passing each course with a target score. The score will be accumulated in Great Point Average (GPA) at the end of study. Student also able to change their goal when the environment changes, and will produce a different outcome at the end[1]. Student can use their will to use a tutelage as a support of their study or not at all, it means student only do once a tutelage in a semester as the academic procedure. In this research a study process is assumed as a black box that can produce a set of goal, the behavior of student during study will not be discussed.

In the university, final score of course can be calculated from three achievements: mid-test, final-test, and home work. Each component has a weight that accumulated 100%. Usually student has a desire target to be achieved at the end of semester, but the target is not a numerical, it is described in quality letter. It can be said that actually the system has 3 outputs to be controlled for getting a good final result. The production of 3 outputs can be defined as a function of system, and then the actual system model of tutelage for one course in one semester can be drawn as figure 3.

On figure 3, each student can set the final target freely, and then the discussion with supervisor is done on tutelage for study planning. After tutelage student execute their plan in study process, it will result 3 achievements score (S_i) and will be weighted (w_i) sequentially on mid-test score (w_1S_1), final-test score (w_2S_2), and home work score (w_3S_3). After Mid-test score of courses is notified, it could bring the student to the tutelage if the advice is needed for reviewing the study strategy. After 3 score components is gained, the final score (F) can be calculated using formula (1). The final score (F) will be converted to the letter score; in this research will use 7 letters. The conversion of final score to the quality score can be seen in the table 1.

$$F=\Sigma\, w_iS_i \tag{1}$$

F = final score,
wi = weight,
Si = achievement score,
i = 1,2,3

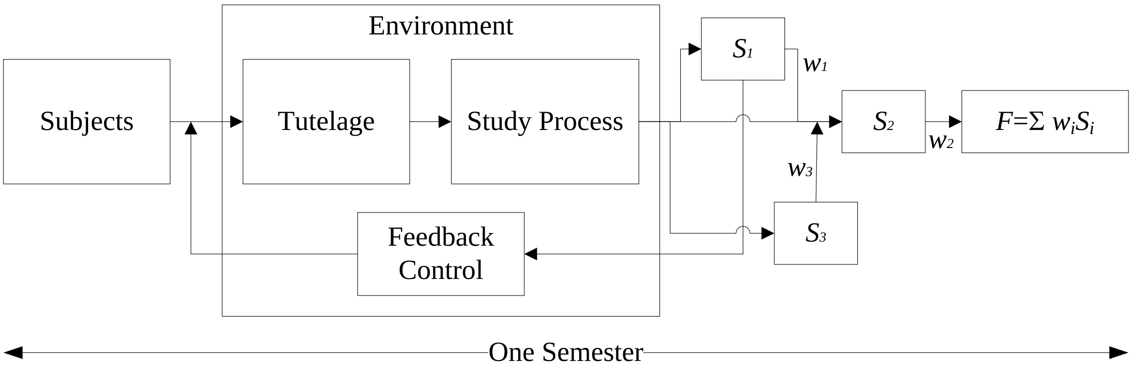

Figure 3. Tutelage Systems of One Course

Table 1 Conversion Score

Range of F	Quality letter	Quality score
80 <= F <= 100	A	4.0
73 <= F < 80	B+	3.5
67 <= F < 73	B	3.0
61 <= F < 67	C+	2.5
55 <= F < 61	C	2.0
41 <= F < 55	D	1.0
F < 41	E	0

The tutelage system model on figure 3 shows the feedback become meaningless because no control parameter can detects the error produced by study process. It will not bring a tutelage process became sustainable. No specific target defined clearly during the discussion of study plan, the advice is given by considering index of average achievement against the limit credit of course that available to be contracted. In theory, a system-control function compares achieve outcome with desired outcomes and makes adjustment in the behavior of the system which are directed towards reducing the observed deficiencies[1]. The tutelage process is working as a control of study process but it doesn't compare any value to make adjustment and no error can be observed by supervisor for any necessary preventive action. A close loop system is designed to equip the tutelage process then it can identify the error occurred in outcome. Since the tutelage cannot do an intervention in study process directly, the capability of system to identify error can be used to force the student to re-discuss their study plan in tutelage by using academic authority. A sustain tutelage can be expected work in accordance with its objectives.

Designing a close loop system model need to generate an initial target that can be compared with the achievement (S_i). The initial target will depict the minimum score of three achievements (*ti*) that must be achieved in the future. The calculation of minimum score will be initiated by determining the desired quality letter (T), then select the minimum *F* (*Fmin*) in the range as the target score. There are 3 combinations of score weight (w_1, w_2, w_3) will be used in calculation. Each combination of score weight will produce 5 combinations of *ti*. Formula (1) is using to obtain *Fmin* by replacing *Si* with *ti*, EXCEL SOLVER can generate the minimum score (*ti*), which *ti* is a prediction of *Si* in the future. In constrain, 20 is assumed as the lowest score can be achieved by student and 100 is assumed as the higher score can be achieved by student. To avoid the extreme value in minimum score, a non linier programming (NLP) is used in SOLVER setting. SOLVER is using Generalized Reduced Gradient (GRG) method as implemented in Lasdon and Waren's GRG2 code for calculating NLP[3]. The mathematical model to obtain *Fmin* with prediction of minimum score (*ti*) can be seen on formula (2). The prediction of minimum achievement score for 3 combinations of weight can be seen in table 2.

$$Fmin = \Sigma\, w_i t_i \tag{2}$$

Constrained by: $20 \le ti \le 100$,
Fmin = minimum final score,
wi = weight,
ti = prediction of minimum achievement score,
i = 1,2,3

Table 2. Prediction of minimum achievement score

wi	*ti*				
	A	B+	B	C+	C
0.35	80.86957	73.76812	67.68116	61.88406	55.50724
0.40	89.56522	81.44928	74.49276	70.72464	60.57971
0.25	63.47826	58.4058	54.05797	44.2029	45.36232
Fmin	80	73	67	61	55
0.35	77.53425	70.82192	65.06849	59.31507	53.56164
0.45	93.9726	85.34247	77.94521	70.54795	63.15069
0.20	52.87671	49.0411	45.75343	42.46575	39.17808
Fmin	80	73	67	61	55
0.20	51.57895	47.89474	44.73684	41.57895	38.42105
0.30	67.36842	61.84211	57.10527	52.36842	47.63158
0.50	98.94737	89.73684	81.84211	73.94737	66.05263
Fmin	80	73	67	61	55

The close loop system will be added by comparator for identifying error (*e*) occurred in the output. Critical error should be identified earlier is S_1 because the achievement can influence the next strategy of study for keeping the previous target T possible to get. In the system, after S_1 is notified, the data will go to the comparator to be compared with the prediction achievement score *ti* from table 2 that will produce error value (*e*). Error value will show how much the discrepancy was happened in progress. A positive discrepancy indicates the study plan has executed properly and a negative

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discrepancy indicates the study plan need has to be re-examined. Supervisor can use negative discrepancy information to lead the student to the tutelage meeting. The re-calculate process *R* is added in the loop system for calculating t_R, which is the recalculating of t_2. Formula (2) is using to obtain t_R which inputs are w_1S_1, w_3S_3 or w_3t_3, and *Fmin*. Re-calculating the prediction of final test score t_2 is preferred because it has a high level of importance to keep on target (*Fmin*). *R* process produces a prediction of final score t_R, it can help student to set a new strategy together with supervisor in the tutelage meeting. In this system supervisor will get 2 information, a negative discrepancy and t_R that can be used to give an advice to student. The final result T_F is the actual achievement at the end of semester; it will be used as a feedback control for the next semester tutelage. The close loop system model can be seen on figure 4.

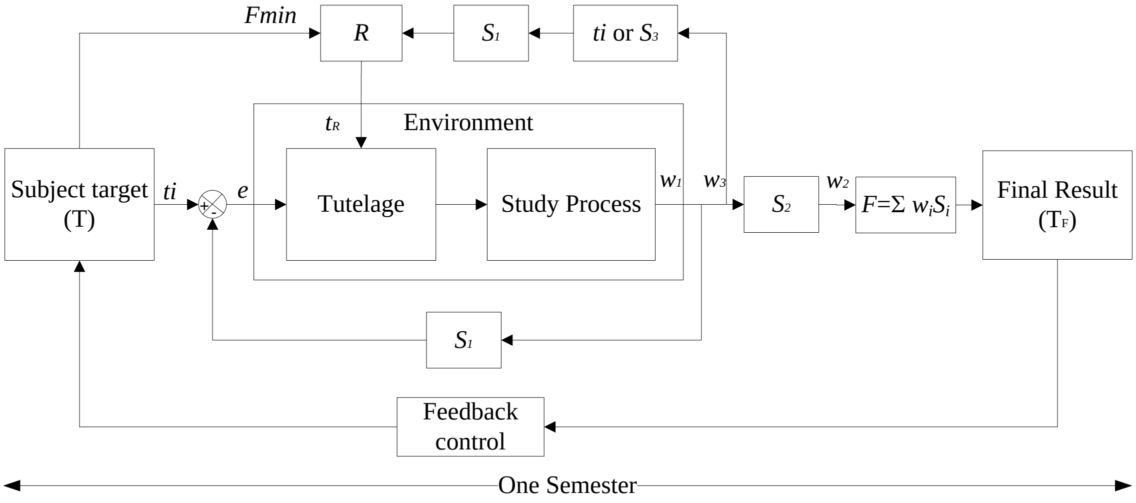


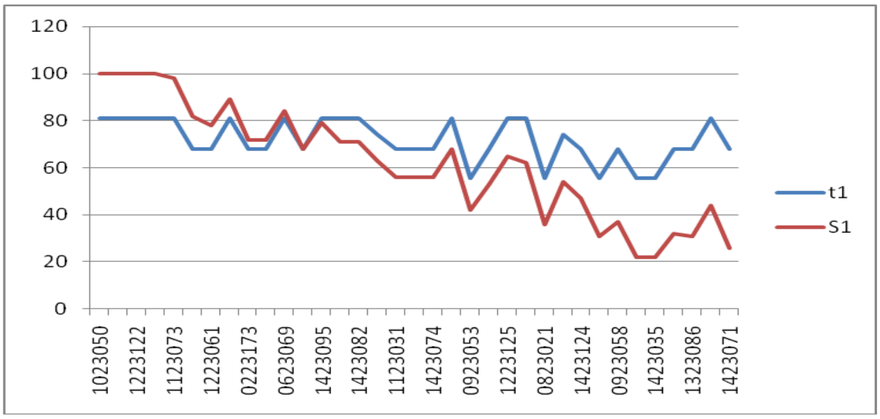
Figure 4. Close loop system of tutelage

RESULTS AND DISCUSSION

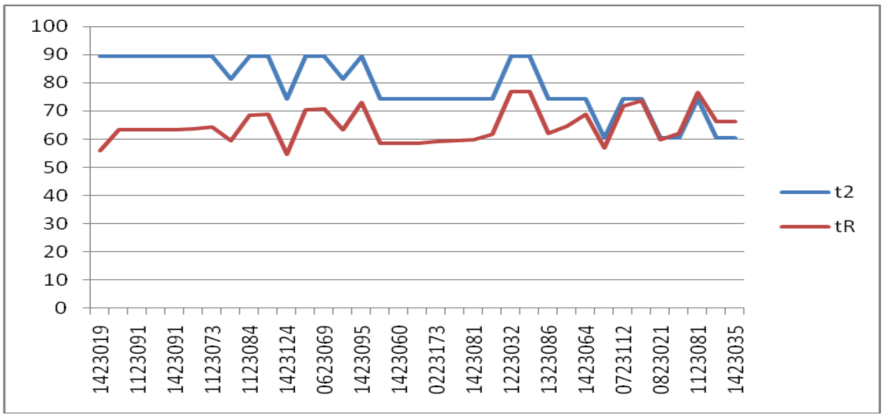
The close loop of tutelage system model has been developed; it will be tested on short course of basic calculus. The calculus course has an easy content at the beginning and will be ended with a difficult content. Thirty three students was asked the target score (T) they would achieve at the end; it was vary from just pass the course in C grade up to A grade. The prediction of minimum score (*ti*) should be achieved at mid test, final test, and home work was notified. In this research mid test and final test is monitored. After mid test score (S_1) notified, it was compared with the prediction score (t_1). Deviation was calculated and the result can be seen on graph 1. Graph 1 shows the positive discrepancy to the negative discrepancy. S_1 approaching zero discrepancy at 42% of population, it means 58% of population have negative discrepancy. The range of negative discrepancy is from -1.9 up to -41.7, students within this range need to be monitored. A negative discrepancy can be occurring because the target is to higher or maybe they have a problem in study, it can be lead to the tutelage meeting for further discussion.

Re-calculation R is done to get the new prediction of final score (t_R), in this calculation will use 2 scenarios, first the home work score is assumed can be predicted then student gives their prediction of S_3. In this case the prediction of home work score is range from 67 up to 98, with average score 81. The discrepancy between t_2 and t_R can be seen on graph 2a. In this case the negative discrepancy means the effort to get the target score (T) is low. The positive discrepancy means students need more effort to keep the target score (T) achieved. Second the prediction score t_3 is assumed same as S_3 then the discrepancy between t_2 and t_R can be seen on graph 2b. The result of calculation t_R will be used as an additional information at tutelage discussion.

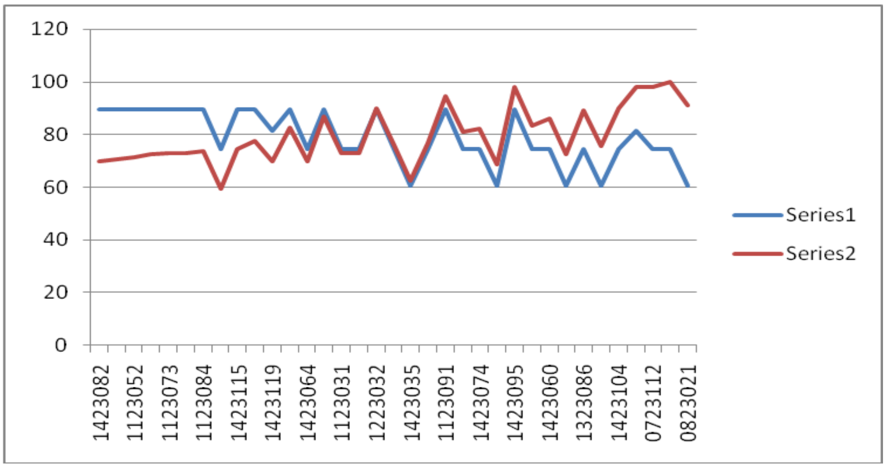
At the end of semester the final test score (S_2) was announced, in this research the final score (S_2) is compared with t_R. In actual implementation the comparison S_2 versus t_R will not be done because the result won't give any changes of final result (T_F). Graph 3a shows the discrepancy of S_2 versus t_R, using scenario 1, which has an average of deviation is -9.1. Graph 3b shows the discrepancy of S_2 versus t_R, using scenario 2, which has an average of deviation is -24.07.



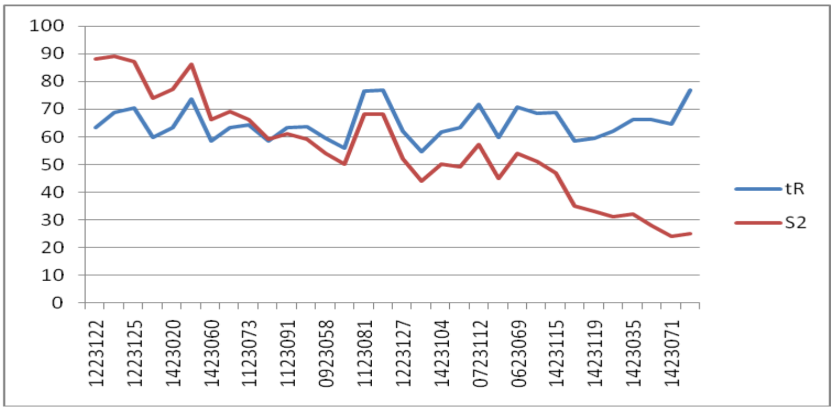
Graph 1. t_1 versus S_1



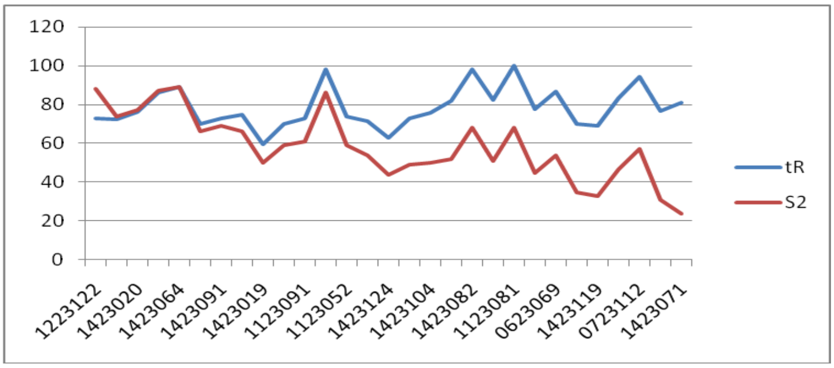
Graph 2a. t_2 versus t_R first scenario



Graph 2b. t_2 versus t_R second scenario



Graph 3a. t_R versus S_2 first scenario



Graph 3b. t_R versus S_2 second scenario

CONCLUSIONS

The close loop system of tutelage has been developed. Model of system has already tested on one course to show that the close loop system able to identify an error. The close loop system also equipped by recalculation process for predicting the final test score t_R after the mid test score S_1 was obtained. Two scenarios were used to calculate t_R, first scenario assume the S_3 has already known by student and the second scenario assume the minimum predicting score t_3 is same as S_3. The first scenario resulted -9.1 in average deviation between t_R and S_2. The second scenario resulted -24.07 in average deviation, it means the prediction t_R versus S_2 has a wide span. In this case the student should be given a chance to select the value of S_3 when calculating t_R.

Implementation of close loop system of tutelage will be done by developing an application of system information. The application will produce information for student and supervisor. The student will be supported by getting the prediction score and do a re-calculation after mid-test score is obtained. The supervisor will get the negative discrepancy which depicts the error of score influenced by loose study process. Supervisor also will get t_R produced by student, both information will be used by supervisor to support student executing the study plan. Close loop system of tutelage can produce a sustainable discussion between student and supervisor.

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