The International Conference on Mathematics, Science, Education and Technology

(ICOMSET 2015)

Education, Mathematics, Science and Technology for Human and Natural Resources

October 22, 2015

Inna Muara Hotel and Convention Center
Padang, Indonesia

Organized by
Faculty of Mathematics and Science
State University of Padang
Padang, Indonesia
Organizing Committee

STEERING COMMITTEE

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- Prof. Dr. H. Agus Irianto (Vice Rector I, Universitas Negeri Padang)
- Prof. Dr. Lufri, M.Si (Dean Faculty of Mathematics and Science Universitas Negeri Padang)
- Dr. Yulkifli, S.Pd., M.Si (Vice Dean I, Faculty of Mathematics and Science Universitas Negeri Padang)

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- Vice Chairman : Ananda Putra, M.Si., Ph.D
- Secretary : Yohandri, M.Si., Ph.D

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- Prof. Dr. Syafrizal , M.Si (UNAND)
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- **Contributed Speaker**
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  - Mathematics Education 3 (M3)  
  - Mathematics (M4)  
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  - Chemistry (C2)  
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  - Biology (B2)  
  - Technology and Other (TO)
Ladies and Gentlemen,

It give me great happiness to extend my sincere and warm welcome to the participants of the International Conference on Mathematics, Science, Education and Technology (ICOMSET 2015). On behalf of Universitas Negeri Padang, let me welcome all of you to the conference in Padang, West Sumatra Province, Indonesia.

We believe that from this scientific meeting, all participants will have time to discuss and exchange ideas, findings, creating new networking as well as strengthen the existing collaboration in the respective fields of expertise. In the century in which the information is spreading in a tremendous speed and globalization is a trend, Universitas Negeri Padang must prepare for the hard competition that lay a head. One way to succeed is by initiating and developing collaborative work with many partners from all over the world. Through the collaboration in this conference we can improve the quality of our researches as well as teaching and learning process in mathematics, science and technology.

I would like to express my sincere appreciation to FMIPA UNP and organizing committee who have organized this event. This is a great opportunity for us to be involved in an international community. I would also like to extend my appreciation and gratitude to keynote speakers and participants of this conference for their contribution to this event.

Finally, I wish all participants get a lot of benefits at the conference. I also wish all participants can enjoy the atmosphere of the city of Padang, West Sumatra.

Thank you very much

Prof. Dr. Phil. Yanuar Kiram
Rector
Message

from the

Dean of Faculty of Mathematics and Science
State University of Padang

Rector of State University of Padang
Vice-Dean of Faculty, Mathematics and Science
Head of Department in Faculty of Mathematics and Science
Distinguished Keynote Speakers
Organizers of this conference
Dear participants
Ladies and gentlemen

I am delighted and honored to have this opportunity to welcome you to ICOMSET 2015 - the International Conference on Mathematics, Science, Education and Technology, which is hosted by Faculty of Mathematics and Science, State University of Padang.

As the Dean of Faculty of Mathematics and Science, I wish to extend a warm welcome to colleagues from the various countries and provinces. We are especially honored this year by the presence of the eminent speaker, who has graciously accepted our invitation to be here as the Keynote Speaker. To all speakers and participants, I am greatly honored and pleased to welcome you to Padang. We are indeed honored to have you here with us.

The ICOMSET organization committee and also the scientific committee have done a great work preparing our first international conference and I would like to thank them for their energy, competence and professionalism during the organization process. For sure, the success I anticipate to this conference will certainly be the result of the effective collaboration between all those committees involved.

This conference is certainly a special occasion for those who work in education, mathematics, science, technology, and other related fields. It will be an occasion to meet, to listen, to discuss, to share information and to plan for the future. Indeed, a conference is an opportunity to provide an international platform for researchers, academicians as well as industrial professionals from all over the world to present their research results. This conference also provides opportunities for the delegates to exchange new ideas and application experiences, to establish research relations and to find partners for future collaboration. Hopefully, this conference will contribute for Human and Natural Resources.

I would like to take this opportunity to express my gratitude to all delegates and sponsors for their full support, cooperation and contribution to the ICOMSET 2015. I
also wish to express my gratitude to the Organizing Committee and the Scientific Committee for their diligence. The various sponsors are also thanked for their kind support.

In closing, I realize that you are fully dedicated to the sessions that will follow, but I do hope you will also take time to enjoy fascinating Padang, with its tropical setting, friendly people and multi-cultural cuisine.

I wish the participants a very fruitful and productive meeting and with that. Finally, we respectfully request the Rector of State University of Padang to open the ICOMSET 2015 officially.

Thank you,

Faculty of Mathematics and Science
Prof. Dr. Lufri, M.S.
Message

from the

Chairman of Organizing Committee

Firstly, I would like to say welcome to Padang Indonesia. It is an honor for us to host this conference. We are very happy and proud because the participants of this conference come from many countries and many provinces in Indonesia.

Ladies and gentlemen, This conference facilitates researchers to present ideas and latest research findings that allows for discussion among fellow researchers. Events like this are very important for open collaborative research and create a wider network in conducting research.

In this conference, there are about 120 papers that will be discussed from various aspects of mathematics, science, technology, education and other related topics.

For all of us here, I would like to convey my sincere appreciation and gratitude for your participation in this conference.

Thank you very much

Drs. Hendra Syarifuddin, M.Si, Ph.D
Chairman
## OPENING CEREMONY

INTERNATIONAL CONFERENCE ON MATHEMATICS, SCIENCE, EDUCATION, AND TECHNOLOGY (ICOMSET 2015)

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**MODERATOR :** Dra. FITRANI DWINA, M. Ed

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</table>

**ROOM/ CODE : 6/ P2**  
**TIME : 14.45 - 18.00**  
**MODERATOR : SYAFRIANI, PH.D**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>P2 - 01</td>
<td>14.45 - 15.35</td>
<td>Optimition of Least Square Inversion Using Occam Method Dipole-Dipole Geoelectric Resistivity Data for Landslide Surface Estimation</td>
<td>Akmam</td>
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<tr>
<td>P2 - 02</td>
<td></td>
<td>Determination of System Dynamic Characteristics Based on A Serial Rc Circuit Model</td>
<td>Arsali</td>
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<tr>
<td>P2 - 03</td>
<td>14.45 - 15.35</td>
<td>Experimental Study on Fiber to The Home Network Characterizations in Optical Test Solution</td>
<td>Aswir Premadi</td>
</tr>
<tr>
<td>P2 - 04</td>
<td></td>
<td>Magnetic Properties and Heavy Metal Content of Leachate Sludge in Waste Landfill, Air Dingin Padang, Indonesia</td>
<td>Fatni Mufit</td>
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<td></td>
<td>14.35 - 15.50</td>
<td>Break</td>
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<tr>
<td>P2 - 05</td>
<td></td>
<td>Monitoring Technology Development Geoelectric Time-Lapse to Monitor The Prone to Landslides Areas in Padang Using Methods Geoelectric Time-Lapse Resistivity Inversion In Wenner And Schlumberger Configuration</td>
<td>Mahrizal</td>
</tr>
<tr>
<td>P2 - 06</td>
<td>15.50 - 16.40</td>
<td>Design of Experiments Set to Determine The Coefficient of Kinetic Friction on Collision of Two Objects</td>
<td>Novia Lizelwati dan Venny Haris</td>
</tr>
<tr>
<td>P2 - 07</td>
<td></td>
<td>Effect of Calcination Temperature on Phase Transformation and Crystallite Size of Granite Powder</td>
<td>Ratna Wulan</td>
</tr>
<tr>
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<tr>
<td>P2 - 08</td>
<td></td>
<td>Mapping The Indonesian Upper Mantle With Multimode Surface Waves</td>
<td>Syafriani</td>
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<tr>
<td>P2 - 09</td>
<td></td>
<td>The Optimization of Calcination Temperatur of <em>Pensi (corbicula moltkiana)</em> Shells to Obtain Calcite CaCO₃</td>
<td>Yeni Darvina</td>
</tr>
<tr>
<td>P2 - 10</td>
<td>16.40 - 17.20</td>
<td>Development of Beam Steering Antenna for CP-SAR Sensor</td>
<td>Yohandri</td>
</tr>
<tr>
<td>P2 - 11</td>
<td></td>
<td>Development of 2D Vibration Detector Using Fluxgate Sensor Based on Personal Computer</td>
<td>Yulkifli</td>
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</tbody>
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**ROOM/ CODE : 7/ C1**
**TIME : 14.45 -18.00**
**MODERATOR : ZONALIA FITRIZA, M.PD**

<table>
<thead>
<tr>
<th>Code</th>
<th>Time</th>
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<tbody>
<tr>
<td>C1 - 01</td>
<td>14.45 - 15.35</td>
<td>Student’s Perception of Mathematics and Science Department of Biology Education Program Toward Basic Chemistry Course at The University Mahaputra Muhammad Yamin Solok</td>
<td>Afrahmiryano</td>
</tr>
<tr>
<td>C1 - 02</td>
<td></td>
<td>The Development of Guided Inquiry Based Worksheet for Laboratory Work on Colloidal System for Senior High School Students</td>
<td>Andromeda</td>
</tr>
<tr>
<td>C1 - 03</td>
<td></td>
<td>Profile of Senior High School Student’s Needs for Life Skill Oriented –Chemistry</td>
<td>Anita Herda</td>
</tr>
<tr>
<td>C1 - 04</td>
<td></td>
<td>The Development of Problem Based Learning Worksheet on Reaction Rate for Senior High School Students</td>
<td>Bayharti</td>
</tr>
<tr>
<td>C1 - 05</td>
<td>14.35 - 15.50</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>C1 - 06</td>
<td>15.50 - 16.40</td>
<td>The Effect of E-Learning in Chemistry Learning Outcomes: A Meta-Analysis</td>
<td>Guspatni</td>
</tr>
<tr>
<td>C1 - 07</td>
<td></td>
<td>Chemical Learning Media Using Android Application</td>
<td>Hardeli</td>
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<tr>
<td>C1 - 08</td>
<td></td>
<td>Profiles Early Generic Skill Prospective Teacher of Chemistry in Jambi University</td>
<td>Haryanto</td>
</tr>
<tr>
<td>C1 - 09</td>
<td></td>
<td>Design and Implementation of Chemistry Triangle Oriented Learning Media on Hydrocarbons</td>
<td>Latisma Dj</td>
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</table>
### Conference Timetable

<table>
<thead>
<tr>
<th>Code</th>
<th>Time</th>
<th>Title</th>
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<tbody>
<tr>
<td>C1 - 09</td>
<td>16.40 - 17.20</td>
<td>Developing Kit and Experiment Worksheet for Electrochemistry at XII Class of Senior High School</td>
<td>Ratulani Juwita</td>
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<tr>
<td>C1 - 10</td>
<td>Implementing Contextual Teaching Strategies In 2013 Curriculum For Colloid Systems Topic</td>
<td>Suryelita</td>
<td></td>
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<tr>
<td>C1 - 11</td>
<td>The Development of Buffer Teaching Material In The Form of Module-Based Discovery Learning for Chemistry in Senior High School</td>
<td>Yerimadesi</td>
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<tr>
<td>C1 - 12</td>
<td>Analysis Of Students Misconception of Atomic Structure In Sma Adabiah Padang</td>
<td>Zonalia Fitriza</td>
<td></td>
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**ROOM/ CODE : 8/ C2**

**TIME : 14.45 - 18.00**

**MODERATOR : SHERLY KUSUMA WARDA NINGSIH, M.SI**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>C2 - 01</td>
<td>14.45 - 15.35</td>
<td>Solubility of Methyl Red and Methylene Blue in Microemulsions and Lamellar Liquid Crystals of Water, Cationic Surfactants and Hydrocarbon</td>
<td>Ali Amran</td>
</tr>
<tr>
<td>C2 - 02</td>
<td>14.45 - 15.35</td>
<td>Biosensor as Food, Environmental and Medical Control</td>
<td>Alizar</td>
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<tr>
<td>C2 - 03</td>
<td>14.45 - 15.35</td>
<td>Trace Metals Accumulation in Vegetables From Some Areas in West Sumatera</td>
<td>Amrin</td>
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<tr>
<td>C2 - 04</td>
<td>14.35 - 15.50</td>
<td>Break</td>
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<tr>
<td>C2 - 05</td>
<td>15.50 - 16.40</td>
<td>Sodium – Diethylidithiocarbamate as A Complex Agent For Preconcentration and Trace Analysis of Cd(II) Based on Flow Injection Analysis</td>
<td>Erpina Santi Meliana Nadeak</td>
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<tr>
<td>C2 - 06</td>
<td>15.50 - 16.40</td>
<td>Assessment of Trace Pb (II) in Sludge From Batang Anai River’s Padang</td>
<td>Indang Dewata</td>
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<tr>
<td>C2 - 07</td>
<td>15.50 - 16.40</td>
<td>Active Sites Prediction and Binding Analysis E1-E2 Protein Human Papillomavirus With Biphenylsulfonacetic Acid</td>
<td>Iryani</td>
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<tr>
<td>C2 - 08</td>
<td>15.50 - 16.40</td>
<td>Cloning of Gene Fragment and Enzyme Structure Modeling of The Bacillus Subtilis Exolevanase Fragment</td>
<td>Minda Azhar</td>
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<tr>
<td>Code</td>
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<tr>
<td>C2 - 09</td>
<td>16.40 - 17.30</td>
<td>Isolation of Antibacterial Activities of The Endophytic Microbes From Asam Kandis (<em>Garcinia Diocia Blume</em>)</td>
<td>Puji Ardiningsih</td>
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<tr>
<td>C2 - 10</td>
<td>17.30 - 18.20</td>
<td>Photoelectrochemical Splitting Of Water By Photoelectric Induced At Carbon Surface</td>
<td>Rahadian Z</td>
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<td>C2 - 12</td>
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<td>Synthesis and Characterization of ZnO Nanoparticles by Sol-Gel Method with Various Additives</td>
<td>Sherly Kusuma Warda Ningsih</td>
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<tr>
<td>C2 - 13</td>
<td></td>
<td>Isolation and Characterization of Flavonoid From Gambier Plant Leaves (<em>Uncaria Gambir</em> R.)</td>
<td>Sri Benti Etika</td>
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<tr>
<td>C2 - 14</td>
<td></td>
<td>An Efficient Method for The Synthesis of Sodium Silicate from The Silica Sand as Commercial Chemicals for Various Industrial Materials</td>
<td>Syamsi Aini</td>
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<tr>
<td>C2 - 15</td>
<td></td>
<td>Synthesis of Copper Oxide Thin Film Via Sol-Gel Dip-Coating Route For Spectrally Selective Absorber Material</td>
<td>Syamsu Herman</td>
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<tr>
<td>C2 - 16</td>
<td></td>
<td>The Effect of Some Parameters Over The Titanium Tetrahedral Framework in The Synthesis of Alkyl Silica-Titania</td>
<td>Umar Kalmar Nizar</td>
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**ROOM/ CODE : 9/ B1**  
**TIME : 14.45 -18.00**  
**MODERATOR : MUHYIATUL FADILAH, M.PD**
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<tr>
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<th>Time</th>
<th>Session Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>B1 - 04</td>
<td>14.35 - 15.50</td>
<td>The Effect Of Giving Homework By Making Mind Map Before Cooperative Learning Thinking Aloud Pair Problem Solving On Students Biology Learning Competency At SMAN 1 Sungai Aur</td>
<td>Helendra</td>
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<td></td>
<td></td>
<td>Break</td>
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<tr>
<td>B1 - 05</td>
<td>15.50 - 16.30</td>
<td>The Modern Instructional Design on Educational Research: How to Use the Adaptive Systems on Instructional of Biology</td>
<td>M. Haviz</td>
</tr>
<tr>
<td>B1 - 06</td>
<td>15.50 - 16.30</td>
<td>Learning Style of First-Year Biology College Students in State University of Padang</td>
<td>Relsas Yogica</td>
</tr>
<tr>
<td>B1 - 07</td>
<td>16.30 - 16.10</td>
<td>Identifying The Misconceptions Relate to Evolution Material Presented in Students Biology Text Book For XII Class</td>
<td>Muhyiatul Fadilah</td>
</tr>
<tr>
<td>B1 - 08</td>
<td>16.30 - 16.10</td>
<td>Biology Education Student's Acceptance of Evolution Theory Before Learn Evolutionary Course in Biology Department</td>
<td>Rahmawati</td>
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<tr>
<td>B1 - 09</td>
<td>16.30 - 16.10</td>
<td>Identifying of Student's Misconceptions on Animal Ecology Concept Through Certainly of Response Index (CRI)</td>
<td>Yosi Laila Rahmi</td>
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**ROOM/ CODE : 10/ B2**  
**TIME : 14.45 -18.00**  
**MODERATOR : DR. SYAMSU RIZAL, M. BIOMED**

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<tbody>
<tr>
<td>B2 - 01</td>
<td>14.45 -15.35</td>
<td>Fish Farming of Nila to Against The Population Reliance of Biological Resources at Kerinci Seblat National Park (Tnks) in Nagari Limau Gadang Lumpo, Pesisir Selatan</td>
<td>Armen</td>
</tr>
<tr>
<td>B2 - 02</td>
<td>14.45 -15.35</td>
<td>Growth and Tomato Nutrien Content with Chick Weed (<em>Ageratum conyzoides</em> L.) Bokashi applied</td>
<td>Azwir Anhar</td>
</tr>
<tr>
<td>B2 - 03</td>
<td>14.35 -15.50</td>
<td>Screening Optimization for Polysaccharide Deacetylase Producer Bacteria Isolated From Shrimp Ponds in East Borneo</td>
<td>Bodhi Dharma</td>
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<tr>
<td>B2 - 04</td>
<td>14.35 -15.50</td>
<td>Pollen Morphometry of Euphorbia Mili Moulins Varieties</td>
<td>Des M</td>
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<tr>
<td>B2 - 05</td>
<td>14.45 -15.35</td>
<td>The effect of Uncaria gambier Roxb Extract on levels of F₂ isoprostanes in the submaximal wexercise</td>
<td>Elsa Yuniarti</td>
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<tr>
<td>B2 - 06</td>
<td>14.45 -15.35</td>
<td>Management Analysis on Plants Morphology Lab Work in Basic Biology Laboratory of Stain Batusangkar</td>
<td>FifiYulia</td>
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<tr>
<td>B2 - 07</td>
<td>14.45 -15.35</td>
<td>Isolation and Characterization Thermophilic Bacteria Which Produce Xylanase From Mudiaak Sapan Hot Spring, South Solok</td>
<td>Irdawati</td>
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<tr>
<td>B2 - 09</td>
<td>14.45 -15.35</td>
<td>Detection of Calcite Bacteria from Hotspring Wawolesea Southeast Sulawesi</td>
<td>Prima Endang Susilowati</td>
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<tr>
<td>B2 - 10</td>
<td>14.45 -15.35</td>
<td>Tetra Primer-Arms-Per Construction to Detect Snp Rs290487 Tcf712</td>
<td>Syamsu Rizal</td>
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### Conference Timetable

**The International Conference on Mathematics, Science, Education and Technology**

**ROOM/ CODE : 11 / TO**

**TIME : 14.45 - 18.15**

**MODERATOR : FRIDGO TASMAN, S.PD, M.SC**

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<tr>
<td>TO - 01</td>
<td>14.45 - 15.35</td>
<td>1-Phase Inverter Trigger Pulse Control Design Based Arduino Microcontroller in The Hybrid Power Plant Regulator Systems</td>
<td>Al</td>
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<tr>
<td>TO - 02</td>
<td>14.45 - 15.35</td>
<td>Geographical Information System Handycraft Application Based on Mobile in Depok City</td>
<td>Budi Utami Fahnun</td>
</tr>
<tr>
<td>TO - 03</td>
<td>14.45 - 15.35</td>
<td>The Technique Of Variable Projection and Rules of Temple Area in Operation of Series</td>
<td>Choirul Huda</td>
</tr>
<tr>
<td>TO - 04</td>
<td>14.45 - 15.35</td>
<td>Model Rules of Student Academic Achievement With The Algorithm C 4.5</td>
<td>Dedy Hartama</td>
</tr>
<tr>
<td></td>
<td>14.35 - 15.50</td>
<td>Break</td>
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<tr>
<td>TO - 05</td>
<td>14.35 - 15.50</td>
<td>Improving Students’ Activities and Learning Outcomes in Natural Science in Class V by Using Somatic Auditory Visual Intellectual (SAVI) with Science Kit Seqip in SD Negeri 25 Seroja Lintau</td>
<td>Erwinsyah Satria</td>
</tr>
<tr>
<td>TO - 06</td>
<td>14.35 - 15.50</td>
<td>Study About Spatial Variation Parameters of Seismothectonics to Knowi the Conditions for Local Stress Tectonics And the Level of Earthquake Activeness in West Sumatra and Around it.</td>
<td>Furqon Dawam Raharjo</td>
</tr>
<tr>
<td>TO - 07</td>
<td>14.35 - 15.50</td>
<td>Design and Constructions of Simple Distilations Unit With Reflux Column Model For Cane Tibarau (Saccharum Spontaneous Linn) Bioethanol Productions</td>
<td>Hasanuddin</td>
</tr>
<tr>
<td>TO - 08</td>
<td>14.35 - 15.50</td>
<td>Analysis of Spatial Impact of Domestic Waste Disposal of Ground Water Quality in the Lowu-Lowu Village, Baubau City</td>
<td>La Ode Muhammad Erif</td>
</tr>
<tr>
<td>TO - 09</td>
<td>14.35 - 15.50</td>
<td>Geographical Information System Handycraft Application Based on Mobile in Depok City</td>
<td>Lely Prananingrum</td>
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<tr>
<td>TO - 10</td>
<td>14.35 - 15.50</td>
<td>Integrated Farming, Creating Zero Waste Environment</td>
<td>Lelya Hilda</td>
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<tr>
<td>TO - 11</td>
<td>14.35 - 15.50</td>
<td>Geographic Information System Web-Based on Creative Industry in West Sumatera</td>
<td>Rina Sugiarti</td>
</tr>
<tr>
<td>TO - 12</td>
<td>14.35 - 15.50</td>
<td>Analysis of Spatial Impact of Domestic Waste Disposal of Ground Water Quality in the Lowu-Lowu Village, Baubau City</td>
<td>Surya Cipta Ramadan Kete</td>
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<tr>
<td>TO - 13</td>
<td>14.35 - 15.50</td>
<td>A Quality of Images Fusion For Remote Sensing Applications</td>
<td>Yuhendra</td>
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<td>TO - 14</td>
<td>14.35 - 15.50</td>
<td>Harmonic Filter Development For Saving and Reliability to Building Electricity</td>
<td>Zulkarnaini</td>
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<tr>
<td>TO - 15</td>
<td>Analysis of Behavior Deflection Composite Particle Board Cane Baggase Using Adhesives Tapioca</td>
<td>Hendri Nurdin</td>
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<tr>
<td>TO - 16</td>
<td>Prediction of Currency Exchange Rate Using Hybridization of Exponential Smoothing and Backpropagation Neural Network</td>
<td>Imelda Saluza</td>
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</table>
ABSTRACTS
In this talk I will outline an approach to the teaching of mathematics, science and technology education based on social responsibility (or Response-ability). I will argue that the primary role MSTE the development of active citizenship. I will present basic components of the Social Response-able Education approach toward developing school knowledge in meaningful way and towards achieving this primary goal. I will illustrate this approach through a project involving schools in Western Australia.
The Design of Solid Catalysts: Some Examples from Universiti Teknologi Malaysia

Hadi Nur

Centre for Sustainable Nanomaterials, IbnuSina Institute for Scientific and Industrial Research, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor, Malaysia

e-mail: hadi@kimia.fs.utm.my; website: http://hadinur.com

ABSTRACT

The design and synthesis of particulate materials for new catalyst systems with novel properties remain a big challenge today. Here an attempt has been made to synthesize metal oxide particulate materials for several heterogeneous catalytic and photocatalytic systems, which contain examples from our recent research projects in this area. The particulate metal oxides catalysts have been designed for single centre catalyst, phase-boundary catalyst, bifunctional catalyst, photocatalyst and chiral catalyst. In our current research, the synthesis of well-aligned titanium dioxide catalyst with very high length to the diameter ratio was also demonstrated for the first time by sol-gel method under magnetic field with surfactant as structure aligning agent.

Keywords: Particulate materials; Heterogeneous catalytic system; Synthesis of titanium dioxide under magnetic field; Liquid-gas boundary catalyst; Bifunctional catalyst; Photocatalyst.
A Millimeter-Wave GBSAR for Landslide Monitoring

Ir. Dr. Chan Yee-Kit¹, Ir. Dr. Koo Voon-Chet²

¹ Associate Professor, Center for Remote Sensing and Surveillance Technologies, Multimedia University, Malaysia
¹ Professor, Center for Remote Sensing and Surveillance Technologies, Multimedia University, Malaysia

ABSTRACT

Every year, over one million people are exposed to weather-related landslide hazards around the World. Due to the recent climate change, it is likely that the decrease of permafrost areas, changes in precipitation patterns and increase of extreme weather events will influence the weather-related mass movement activities. This paper reports the recent development of a ground-based synthetic aperture radar (GBSAR) for continuous monitoring of landslide-prone areas in Malaysia. It is an ultra-wideband system operating at K-band with spatial resolution of 0.5 m in range and 2.9 mrad in cross range. The system is mounted on a rail which travels along a linear guide to achieve SAR imaging. The GBSAR has been installed at a test site to provide timely information for landslide monitoring and early warning system. The paper discusses the design, development and field experiments using the new GBSAR system.

Keywords: Synthetic Aperture Radar, Interferometry, Landslides, Millimeter-wave, Environmental Monitoring
MATHEMATICS EDUCATION 1 (M1)
M1 - 01 Etnomathematics (Mathematical Concepts in Minangkabau Traditional Game)

Adri Nofrianto, Mathematics Department, Faculty of Mathematics and Science, Teaching and Educational Higher School YDB Lubuk Alung, adrinofrianto@gmail.com

The aim of the study is to explore mathematical concepts that can be developed by playing a minangkabau traditional game. The game that is observed in this study is a stick game (main lidi or cimene). This game is played by children in age of 4 until 14 years old. The primary concern of this paper are developing algebra concepts. It can develop number senses, basic counting principle such as addition and multiplication, placing value, and basic symbols. The side findings are it can develop children’s character and children scientifics culture. Furthermore, this paper will provide a new insight in “cimene” game to Minangkabau society and it also give the opportunity to save the traditional games from extinction.

M1 - 02 Developing Calculus Learning Model Based on the Theory of APOS (Action, Process, Object, and Schema)

Hanifah, Universitas Bengkulu, ifahzen@gmail.com

Based on the results of the preliminary research, it was figured out that the learning process of Calculus was not yet run optimally. This research, then, was designed for developing Calculus Learning Model based on the Theory of APOS, and to reveal the validity, the practicality and the effectiveness of the model developed.

This was a developmental research which applied Plomp design that consisted of three phases covering 1) preliminary research, 2) prototyping phase and 3) assessment phase. In prototyping phase, an informative evaluation that consisted of experts’ review, individual try-out, small group try-out and big group try-out was done. The validity of the data was seen from the validation activities done by the experts on Calculus Learning Model based on the theory of APOS, the syllabus, the Lesson Plan, the Worksheet and the Maple Introduction. The practicality of the data was measured through filling the fit and proper questionnaire done by the experts, observation on the implementation of the model done by the observer and filling the worksheet done by the lecturers and the students. The effectiveness of the model was seen through observing the students’ activities, observing the lecturer’s ability to manage the Calculus Learning Model based on the theory of APOS, distributing motivation questionnaire and responsive questionnaire to the students and administering a posttest. The data gathered then was analyzed by using descriptive statistics and inferential statistics.

The results of data analysis indicated that the development of Calculus learning Model based on the Theory of APOS significantly could increase the students’ learning outcomes. Therefore, Calculus II Learning Model based on the Theory of APOS developed was valid, practical and effective.

Based on the finding above, it was concluded that MPK-APOS model was in line to the development of educational paradigm which moved from teacher-centered learning to student-centered learning. The implication of this research is that the theory of APOS should be widely introduced to Mathematics lecturers to improve the quality of learning process. For the upcoming researchers, it was suggested to develop the model to the other similar lectures in order to find out the effect of the theory of APOS on Calculus subject.
M1 - 03 Developing Students’ Mathematical Communication Ability Through Realistic Mathematics Education (RME) Approach

Dr. Ahmad Nizar Rangkuti, S. Si., M.Pd., Lecturer in Mathematics Education Departement IAIN Padangsidimpuan, Indonesia, e-mail: nizarahmad1304@yahoo.com

This research was a reaction to students’ low ability in mathematical communication. It was found that students got difficulty to analyze figures, graphics and other mathematics problems. To solve the problems, the researcher conducted an attempt to change the mathematics teaching by using Realistic Mathematics Education (RME), which is an approach using real world contexts as starting point of the learning paradigm, started from informal to formal mathematics (concepts and algorithms). This research was aimed to explore the extent of students’ mathematical communication ability by using Realistic Mathematics Education (RME) in fraction topic at grade III of IT Primary School of Bunayya Padangsidimpuan.

A Classroom Action Research (CAR) was conducted at class III-1 IT Primary School of Bunayya Padangsidimpuan which consisted of 20 students at 2013/2014 year period. To collect data, the researcher used test, observation sheet and field notes. Therefore, quantitative and qualitative data analyses were conducted to give meaning to the collected data.

It was found that the application of Realistic Mathematics Education (RME) could improve students’ mathematics communication ability. The components are: 1) ability to express mathematics ideas orally, to demonstrate and to present visual description; 2) ability to comprehend, to interpret and to evaluate mathematics ideas orally and visually; and 3) ability to employ mathematics terminologies, notations, and structures for presenting ideas and for describing relations by using models of situations.

M1 - 04 The integration of Sosial and Spiritual Competences Curriculum 2013 in Math subject in State Junior High School of Medan

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The purpose of this research is to find the patterns of competence integration of spiritual and social which contained of the planning process, implementation of learning, and assessment of learning and also developing textbooks, especially in mathematics in class VII Junior High School which capable with integrating competencies in spiritual and social while inserting the competence of knowledge and skills in it. In the field of this researchers was found some things that hinder the integration of the two competencies, namely the teachers still do not fully understand how the planning was integrated with Main Competention 1 and 2, the learning model which used in the learning process does not supporting the process of forming the character of the students yet. Similarly, in the process to make the matter, a teacher does not insert spiritual and social values in sentences and just base on multiple choice questions.

Integration of spiritual and social value in learning is very dependent on the learning model that corresponds to the characteristics of learning materials. There are several approaches that teachers can do to inspiritual and social values. First, the value investment approach that is conducted through the example of a teacher. Second, value clarification approach is done through the reflection of the lesson in the classroom. And the third is learning approach to do. Everything can be summed up in problem based learning (problem based learning), based on the project (project based learning), search (inquiry learning), discovery (discovery learning) and other learning that
combines the spiritual and social values.

**M1 - 05 Self Evaluation Phase Define Basic Algebra Module Based On Inquiry Equence And Material Series**

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This research aims to evaluate the problems and needs as a preliminary analysis on basic algebra module based on inquiry sequence and material series. Development methods used the model of IDI which consists of three major phases systems approach are define, development, and evaluation. A preliminary analysis performed on the stage of the define. The technique of data collection is done through the analysis of the syllabus, basic algebra book analysis, interviews with lecturer and students, and the test of students early ability. The data obtained are analyzed qualitatively. The instruments used are the guidelines of interview and test of students early ability. Based on a preliminary analysis, it is found that nothing much competence in basic algebra syllabus has not been able to prepare students in situations to do his own experiments widely, asking questions and looking for answers myself as well as linking the answers with one another as well as linking what it finds to those found by other participants. Learning methods used by lecture so that students are still not accustomed to solve problems such as the applicative problems. As well as also with book learning there hasn’t been worn during the process of inquiry and still use the book of junior and senior high school. The test results indicate that students early ability of 35 students, 68% state that students have been identify problems but there are settlement strategy is wrong, but wrong, and explanations and interpretations presented by the student is still wrong, 26% stated that can identify the problem correctly but the completion strategy is wrong, and 6% State that the students have been able to identify the problem, find the strategy completion and the correct interpretation.

**M1 - 06 Timss Model Problems Math Development for Junior High School**

Ariyani Muljo, M.Pd

The latest results of the TIMSS 2011 further complement the low ability of Indonesian students in comparison with other countries. In the TIMSS test of Indonesia has continued to be at the lowest level. On the Implementation of TIMSS last time in 2011 Indonesia was ranked 39 out of 43 countries. These results indicate that Indonesian students are not accustomed to using reasoning to solve complex problems (about non-routine). Math’s in the TIMSS study measuring levels of student ability than just knowing the facts, procedure or concept and then apply the facts, procedure or concept to use them to solve simple problems to problems that require a high reasoning. This research aims to develop a math problem TIMSS valid models for high school students (SMP) and examine the effectiveness of the model TIMSS math problems for school students (SMP). TIMSS math models developed focusing on the material algebra and number. Because TIMSS math models developed oriented reasoning skills to solve problems and therefore problems with indicators adapted mathematical problem solving.

This research is the development of the model of formative evaluation. Problem was developed in two stages: preliminary and formative stage of evaluation that includes self evaluation (analysis and design), prototyping (expert reviews, one-to-one and small group) and field test. The data
collection techniques are walkthroughs, interviews, and tests TIMSS math models with expert validation sheet instruments, the questionnaire, and the results of tests TIMSS math models.

In the field test phase which consisted of 32 students showed that students' average score was 61. This value is simultaneously interpret that math TIMSS developed models included in the category effectively. Thus, the TIMSS math models developed can be used to enhance the ability of junior high school students' mathematical reasoning.

M1 - 07 Characteristics of Learning to Enhance Capabilities Understanding Concept Mathematical Learners
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The ability of understanding mathematical concepts is the most important in the study of mathematics. This capability will be the basis to be able to master other skills in mathematics. Most educators ( teacher / lecturer ) often complain about the lack of ability of understanding mathematical concepts learners. Some research has been done to give an idea of learning that can improve the ability of understanding mathematical concepts learners. Through this paper will present a review of the results of the study related to an increase in the ability of understanding mathematical concepts learners.

M1 - 08 Statistical Analysis of the Relationship Pedagogic and Professional Capabilities Results Competency Test Teacher Senior High School West Sumatra Province
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Professionalism of teachers is often attributed to one factor that is quite important, namely the competence of teachers. Competent teachers can be evidenced by the acquisition of teacher certification following an adequate allowance according to the standard of Indonesia. The problem that arises then, that the teacher is assumed to have had the competence which is only based on the assumption that they have been certified, it seems in the long term it is difficult to be accountable academically. Post-certification should be an early milestone for teachers to constantly improve competence by means of lifelong learning. Teacher professional current and future, need improvement primarily related to the increase of professional and pedagogic competence.

This study aims to determine the relationship of pedagogic and professional competence of high school teachers in Sumatera Barat. The method, which used is a quantitative approach. Data was collected by the method of documentation, obtained by collecting data from Teacher Competency Test (UKG) at Senior High School, which is an average value of UKG in 2012 to 2014. The data analysis began with a description of the data that displays the data, the value of descriptive statistics, and graphical representation. Data was processed by inferential statistical analysis which includes the data paired t-test, correlation analysis, and regression analysis. Data unpaired t test performed to see whether there is an increased ability pedagogical teacher from 2012 to 2013 and 2013 to 2014. Correlation and regression analysis were used to examine the relationship pedagogical ability and professional competence.

Based on the results of the data paired t test at significance level $\alpha = 5\%$ concluded that there is pedagogic competence and professional competence upgrading of teachers from 2012 to 2013, but
there is no pedagogic competence and professional competence upgrading of teachers from 2013 to 2014. The results of correlation analysis showed, at the level $\alpha = 5\%$ real correlation pedagogic competence and professional competence of the UKG results on 2012 and 2013. The value positive of correlation indicates that the higher a teacher's professional competence, the pedagogic competence also be higher, vice versa. However, here the level of relations between the two abilities are not as tight as the relationship between both the ability to UKG in 2013. There is no relationship between pedagogic and professional competence of the results of UKG 2014. In this case showed that it is not always upgrading professional skills are also accompanied by increased pedagogic competence. Furthermore, the results of the regression analysis for the ability of pedagogic and professional competence UKG data from 2012 to 2014 assuming a pedagogic competence as dependent variables and professional competence as independent variables. Based on the results of UKG 2012 professional competence affects the pedagogic competence. In this case, for an increase of one point score of professional competence will be accompanied by increased scores 0.78 pedagogic competence. Results of UKG 2013 professional competence affect the pedagogic competence. This can be seen increase of one point score of professional competence will be accompanied by a score of 0.412 increase the ability of the pedagogic results. Where as of UKG 2014 showed that abilities of professional did not affect the ability of pedagogic competence.

M1-09 Development of Mathematics Instructional Model Based on Realistic Mathematics Education to Promote Problem Solving Ability Junior High School Students of Padang

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This research aims to develop a mathematics instructional model based realistic mathematics education (RME) to promote students' problem-solving abilities. The design research used Plomp models, which consists of preliminary phase, development or prototyping phase and assessment phase. At this study, only the first two phases conducted. The first phase, a preliminary investigation, carried out with a literature study to examine the theory-based instructional learning RME model, characteristics of learners, learning management descriptions by junior high school mathematics teacher and relevant research. The development phase is done by developing a draft model (an early prototype model) that consists of the syntax, the social system, the principle of reaction, support systems, and the impact and effects of instructional support. Early prototype model contain a draft model, lesson plans, worksheets, and assessments. Tessmer formative evaluation model used to revise the model. In this study only phase of one to one evaluation conducted. In the preliminary phase has produced a theory-based learning RME model, a description of the characteristics of learners in class VIII SMPN Padang and the description of teacher teaching in the classroom. The identification result, most students are still not able to solve the non-routine problem. Teachers have not been optimally facilitates students to develop problem-solving skills of students. Development phase produced a draft model that consists of the syntax, the social system, the principle of reaction, support systems, and the impact and effects of instructional support. Based on expert and teacher opinion, the model can be applied in the classroom.

M1-10 Improving The Professional Competence of Elementary School Teacher Through Programmed Training In Working Up A Student Sheet Based

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This study was to describe the activities programmed workshop can improve the professional competence of teachers in preparing students worksheet based on critical thinking mathematically in elementary schools Pasaman. The population is all teachers who taught at the elementary level as high as grade IV, V, and VI at five elementary schools for six districts of 12 (twelve) District in Pasaman. The samples in this study were teachers who teach mathematics that randomly selected from the population as many as 84 peoples. This research is held in August of school semester 2015/2016.

The method in this study is workshop method of learning by making students worksheets based on critical thinking mathematically in order to improve the professional competence of elementary school teachers. The data were analyzed qualitatively that is ability of the professional competence of teachers in the study sample. Descriptive analyzes were conducted to determine the relationship of workshop program to create and produce a spreadsheet-based on students critical thinking mathematically in improving the professional competence of teachers sampled in Pasaman.

The results of the calculation using paired t test with SPSS software, the result that t count equal to -6.35 with probability (sig) 0.00. Therefore the probability 0.000 <0.05 then H0 is rejected, which means the results of pretest and post-test results is not the same or significantly different. The output is also displayed differences in mean of 6:12, the average difference pretest and posttest moment. This shows that the professional competence of teachers in making students worksheets on based critical thinking mathematically programmed prior to the workshop are given pre-test and generates an average value of 38.85 in the category of less competent while after the workshop activities programmed, test values obtained heading 44.97 by category competent enough.

M1 - 11 Improving Teacher’s Professional and Pedagogi Competence Through Lesson Study
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This paper discuss about how lesson study can be improve teacher’s professional and pedagogi competence. Lesson study base on MGMP Mathematics teacher in Padang is one of effort to improve the quality of Yunior High School (SMP/MTs) through joining Indonesia Government and Japan that called PELITA-JICA Program. Lesson study is an activity to improve teacher quality. Generally, it consist of three parts, those are: plan, do, and see. During lesson study teacher get some benefit experience to improve their professional and pedagogi competence.
MATHEMATICS EDUCATION 2 (M2)
M2 - 01 Improved Mathematical Communication Abilities Through Implementation The Firing Line’s Strategy at VII Class of Junior High School
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The purposes of this research were to improve the ability of students in mathematical communication which they get Firing Line learning, and assessing the improvement of students’ mathematical disposition after apply the Firing Line and conventional learning. This research is a quasi experiment with design group control non-equivalent. The population of this research is class VIII SMP which one of the junior school in Padang. The class selected as a control group who obtain conventional learning and the other classes as the experimental group gained the firing line learning. The instrument used to collect data in this study consisted of test and observation sheets. Then, test will be analysed with the SPSS 17. The results of this research is the ability of student’s mathematical communication who get the Firing Line learning is better than students who get conventional learning.

M2 - 02 Analyzing Primary School Teachers' Understanding on Mathematical Basic Concepts
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The aim of the research was to describe the understanding of primary school teachers in West Sumatra Indonesia on some mathematical basic concepts in geometry and numbers. This was a descriptive research. The subjects of the research were 108 primary school teachers who attended the master program of basic education in State University of Padang. Data were collected through a test and analyzing the teachers’ works. Collected data were analyzed using qualitative technique and descriptive statistics. The results of the research show that most teachers lack of understanding on geometry basic concepts. They could not explain the properties of geometry basic shapes such as rectangle, parallelogram, rhombus, and triangle correctly. They also did not understand how to determine the area of an obtuse triangle. Most primary teachers have difficulties in number operations, especially division of decimal numbers.

M2 - 03 The Use of Concept Map to Improve Attentiveness and Diligence on Elementary Linear Algebra Course at State University of Padang
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The low of students’ attentiveness and diligence in learning mathematics needs to be handled. An alternative to overcome this condition is using concept map in teaching and learning mathematics. As a lecturer at Mathematics Department of State University of Padang, I have used concept map as a strategy in my teaching practice through an action research for a semester. The finding of the research is the use of concept map can improve students’ attentiveness and diligence in learning elementary linear algebra.
M2 - 04 Developing Mathematical Representation Skills of Students Junior High School Through Contextual Learning

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This research involve 3 Junior High School in Pekanbaru that representation of high level, medium level, and low level. Focus of this research are to know about: (1) Raising of student mathematical representation skills in experiment group comparison with students in control group; (2) interaction about learning and school levels with mathematics representation.

Method of this research is quasi experiment with 2 groups. They are experiment and control group. Experiment group using contextual learning and control group using expository learning. Pretest and postest are using to get data. Mathematical representation skills in this research consist of 3 part. They are visual representation, simbolic representation, and verbal representation. They are internal representation.

Research finding are mean of raising student mathematical representation skills is better than student mathematical representation skills (in high, and low level). But in medium level, student mathematical representation are using contectual learning is lower than student representation are using expository learning. Student mathematical representation skills in low level is better than in medium level. Student representation skills that lowest is simbolic representation. They are interaction between higest school level and medium school level, and then between higest school level and lowest school level with contextual and expository learning about raising of student mathematical problem solving skills.

M2 - 05 Effect of Problem Posing Learning Model Towards Mathematical Problem Solving Ability in Class X Senior High School Student

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Students’ mathematical problem solving skill is one of ability that should be mastered by student in math learning. However, based on observations and interviews it is known that students still difficult to solve story problems that are non-routine. It means students’ mathematical problem solving skill is still low. Application of problem posing model could be an alternative to improve students’ mathematical problem solving skill. Phases of the problem posing model can help students to improve it, and also can train students’ problem posing skill. This research is a quasi-experimental design with Randomized Control Group Only Design. Results from this study shows that students’ mathematical problem solving skill by applying problem posing model is better than conventional learning at SMAN 1 Payakumbuh. Then, development of the students’ problem posing skill is good.

M2 - 06 Needs Analysis of The Development Calculus Integrative Al-Quran

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This study was motivated by the demands of the National Standards for Higher Education (SNPT)
Permendikbud No. 49 Tahun 2014 pasal 11 ayat 1 of the learning process in college. It is also in line with the vision and mission of Program Studi Tadris Matematika STAIN Batusangkar. As a first step, the lecturers are required to develop learning materials based on an integrative approach. Integrating these learning materials should be started from the basic material in mathematics, namely the basic calculus. To that end, there should be an analysis of the need for the development of calculus integrative al-Quran.

The type of research is a descriptive study. Activities include: analyzing curriculum, analyze the course syllabus Calculus 1, spread out questionnaires to students, and interviews peers. The instrument used is the documentation, enclosed questionnaire and interview guide. Data analysis technique conducted qualitatively by Miles & Huberman.

The results showed that (1) the implementation of learning calculus only meet the standards of the learning process in college on interactive characteristics, contextual and collaboration, while for the characteristics of scientific and centered on the student still in category enough. (2) Learning calculus do not meet the characteristics of integrative learning. Integrative paradigm for this still partial, that is by inserting religious subjects in the study program curriculum. Results of this study provide a recommendation that the development of teaching materials calculus integrative al-Quran needs to be done in order to realize the vision of the mission of the study program.

M2 - 07 Analysis of Factors Influencing the Student’s Academic Survival at STAIN Batusangkar
Lely Kurnia, STAIN Batusangkar

This research objectives were to identify the factors influencing the students’ academic survival, especially for the students of Mathematic Department of STAIN Batusangkar. This research used two methods. The logistic regression were used to analyze the student who can survive and who cannot survive or dropped out from Math with biner categorical as a response, while the survival analysis were used to investigated the data deal with the characteristics of the censored data, continiu variable as a response. In general, these analysis showed similar result, that the factors influencing the student’s academic survival are the major in high school and the grade point average (GPA) at the first semester.

M2 - 08 The Process of Deductive Thinking at Junior High School Students in Completing Geometric Proof
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Deductive thinking have attracted mathematicians especially for geometry field. Deductive can be noticed as the way of deduction from general to specific statement which involves mathematical concepts. In other words, deductive thinking consists of three steps started with making general statement (PU), specific statement (PK) and conclusion (K).General statement can be seen as axioms, definitions, and theorems. Meanwhile, specific statement deals with general statement. Then, making a deduction that follows logically when the general statement is applied to the particular statement.

The objective of this study is to describe the profile of deductive thinking of junior high school students in solving geometric proof. To gain this purpose, researcher employs three types of instruments; mathematics ability test determines the participant, problem solving task (TPM)
Mathematics Education (M2) describes the process of deductive thinking as well as the interview guidance. The participant consists of female and male student who have similar ability.

The study reveals that the profile of deductive thinking of junior high school students in accomplishing geometry problems as follows: both of subjects start to make general and specific statement after constructing and labelling geometry shape. There are strong connection between those statement since specific statement refers to general statement. Then, subjects use premises which have been proven their validity and make conclusion deductively. Female subject use the strategy of deductive thinking which is more pressure in algebra process and substitution method. On the other hand, male subject rely on his visual ability so that finding the shortest solution.

M2 - 09 The Implementation of Visual Thinking Approach in Learning Activity with a Quick on the Draw to Improve the Problem Solving Ability and Students’ Mathematical Communication of Junior High School Students
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This study is based on low ability in problem solving and students’ mathematical communication. In order to overcome the problem, the study is done using Visual Thinking approach in learning activity with a Quick on the Draw activity. This study examines the problem of improvement in problem solving and mathematical communication among students who receive Visual Thinking learning approach with the quick on the draw activity and conventional learning approach which reviews whole students and students’ mathematical prior knowledge (high, medium, and low). This is a quasi-experimental design with nonequivalent control group design and uses purposive sampling technique. Population in this study was VIII grade students of SMP in city of Pekanbaru, Riau year 2012/2013. Furthermore, the sample of this study was VIII grade students in a SMP of city of Pekanbaru, Riau. Instrument in this study was a test of problem solving ability and mathematical communication, attitude scale, observation sheet of teacher’s and students’ activities. Quantitative analysis was performed sing the average difference test. The result of the study showed that: (1) The increase in students’ ability of mathematical problem solving whereas the students received Visual Thinking approach in learning activity with the Quick on the Draw activity is better in comparison with conventional learning approach which reviews whole students and students’ mathematical prior knowledge (high, medium, and low); (2) the increase in students’ ability of mathematical communication whereas the students received Visual Thinking approach in learning activity with the Quick on the Draw activity is better in comparison with conventional learning approach which reviews whole students and students’ mathematical prior knowledge (high, medium, and low).

M2 - 10 Developing Students’ Statistical Reasoning Thought the Design Hypothetical Learning Trajectory
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Statistical reasoning is the understanding and being able to explain statistical processes, and being able to interpret statistical results. Developing of students’ statistical reasoning was designed by using a hypothetical learning trajectory. Hypothetical learning trajectory (HLT) consist of three components, namely (1) the learning goals that define the direction; (2) the learning activities; and (3) the hypothetical learning process. This paper describes the initial design the hypothetical learning trajectory for the hypothesis testing materials.
MATHEMATICS EDUCATION 3 (M3)
M3 - 01 Analysis Validity LKM Based Contextual Algebra Basic in Stkip PGRI Sumbar

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Achievement of competence in basic algebra course is supported by many factors. One factor that is able to support the achievement of expected competencies is the use of teaching materials. At this lecture the students rely on textbooks as the handle on the lecture. However, textbooks are not able to actively engage students in learning. Lack of student involvement in building an understanding of the concept led to easy to forget the material. This implies a low learning outcomes. Therefore, it needs a lecture materials that can help students, in the form of LKM. The research objective is to develop a contextual-based LKM valid by using 4D model (define, design, develop, and desseminate). Research has been conducted to define and design stage. At define obtained the following results 1). Basic Algebra material is in conformity with the standards of competence and basic competences subjects. 2). material on LKM used are in accordance with the syllabus. 3). Most students have difficulty understanding the concept, 4). Students have not been able to develop the information obtained in the course face to face because of the logic and systematic way of thinking students who are not able to construct knowledge, 5). students often are not able to develop a theory, because there are many students who memorize the theory without understanding the meaning contained, 6). lecturer difficulty of choosing the right way to communicate the theory lectures.

M3 - 02 A Model Development Of Combinatoric Using Interactive Multimedia Adobe Flash CS6 With Problem Based Learning Approach At University

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The preliminary research on combinatoric classes in Departemen of Mathematics in Tarbiyah and Teaching Faculty of IAIN Bukittinggi, reveals that instructional process not yet facilitated the student to construct their own meaning in combinatoric. The effectiveness of the learning combinatoric was low and learning process was teacher’s centered. In addition, the lecturer is seldom to use media in learning process to improve student’s comprehension. So that, it needs for a development combinatoric using interactive multimedia by adobe flash CS6 with problembased learning (PBL) approach. The purpose of this research were to develop a model of combinatoric using interactive multimedia byadobe flash CS6 with problembased learning approach at university which is valid, practical and effective. This research is a design research adapted from the model suggested by Plomp (2013: 19) that consists three phases: preliminary research, development or prototyping phase and assessment phase. The subject of the research was 30 thirt semester students in Departemen of Mathematics in Tarbiyah and Teaching Faculty of IAIN Bukittinggi. Data were collected through observation, questionnaires and test. The result of data analysis concludes that model development of combinatoric prototype is valid based on content, construction and language. It can be conclude from the questionnaires datathat use of interactive multimedia by adobe flash CS6 has been a practical use. The try out tested on the students has given potential effect which is the student like to study usingusing interactive multimedia by adobe flash CS6 with problem based learning approach with student activity level in a very hight criteria and the average of final mark in a very good criteria.
M3 - 03 Development of Mathematics Instructional Model -Based Contextual Assisted ICT in High School
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This article aims to explain the procedure of the development of research-based math learning model contextual assisted ICT in the subject matter Function Exponent and logarithm functions in class X Science High School. The method used is the research and development with model development procedure Plomp (2013) which consists of the preliminary stage, prototyping stage; and the assessment stage. Learning approach used Contextual Teaching and Learning (CTL) in accordance with the seven components described by Johnson (2010), which consists of constructivism, inquiry, questioning, learning community, modeling, reflection, and authentic assessment. Learning with ICT using Maple software and E-mail. In this paper also described the research products in the form of books students use mathematical models based contextual learning with ICT-assisted learning model using elements characteristic of the preparation Joyce & Weil (2011). Additionally described the effectiveness of the model seen from the aspect of affective, cognitive and psychomotor. In the affective aspect analyzed motivation to learn mathematics, cognitive aspects in terms of mathematical metacognition ability in solving mathematical problems, and psychomotor aspects seen in mathematics learning activities.

M3 - 04 Examine the Interaction Between Learning and KKM Students to Increase Communications and Problem Solving Mathematics Ability In Junior High School with Applying REACT Strategy
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This research aims to look at the interaction between learning and mathematical abilities category (KKM) students to increase communication and problem solving mathematics ability of students after applying the REACT strategy. This type of research is a quasi-experimental design with non-equivalent control group. The population around the junior high school students in Pekanbaru. The sampling method used purposive sampling, in order to obtain samples in this study were junior high school students of class IX. The instrument used was a test of mathematical communication and problem solving mathematics ability test. The analysis of data utilized Two Way Anova test. The results showed that there was interaction between learning and KKM students to increase students' mathematical communication ability, while the increase in students' mathematical problem solving ability is obtained that there was no interaction between learning and KKM students to increase students' mathematical problem solving ability.

M3 - 05 Presenting The Material of Linear Equations Systems Two Variables with the Scientific Approach
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The materials of Linear Equations Systems Two Variables (LESTV), is a material which provided in the curriculum in 2013 for senior high school students. In presenting the material, a teachers have difficulty in many ways. Starting from a low ability of students, till to the inadequate facilities. So the teacher looking for a shortcut so that the whole matter can be presented to students. To answer these challenges, need to look for solutions in conveying the material LESTV.
For that offered an approach that can be used by teachers in presenting the material. Such an approach in the form of an approach that enables and match for students to find their own formulas and procedures in understanding the material LESTV. In such an approach students can associate step by step, until they can conclude their own way of solving the problems.

M3 - 06 Using Maple Software For Improve Student Learning Outcomes Calculus Math Department FMIPA UNP Padang

Yerizon, FMIPA UNP Padang

From the author's experience teaching Calculus further found that students are very difficult to describe the graph of the function of two variables or a sketch of the shape of space objects. Knowledge of space objects is indispensable in almost all of the material Calculus study further. Without understanding this, the students will have difficulty in mastering the material further Calculus.

One of the media allegedly used effectively to combat this is the computer media with Maple Software. Maple Software available in the facility to draw or visualize the various graphs of functions ranging from simple to complex. Aside from the Maple Software can also be used for other calculations such as calculating limits, derivatives, integrals, and so on.

Based on the learning process further research Calculus class action by using Software Maple. This research was conducted in two cycles. The subjects were all students of Department of Mathematics UNP Padang Calculus courses that follow-up totaling 21 people.

The result showed that the use of Maple Software is helping students to make a graph of a function of two variables or the graphic objects space. Apart from that the students can also check whether the exercise made is correct or not. As a result, students are motivated to learn. So that the learning outcomes gained more leverage we need to hold a small exam at the beginning of the learning process. Given this small test, the more active students to learn.

M3 - 07 Improving the Second Year Students’ Activity and LearningMastery through Realistic Mathematics Education Approach at MTsN Olak Kemang Jambi

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Mathematics had an important role in preparing students to be able to think logically, analytically, systematically, critically and able to work in a group. Unfortunately, based on the observation which was done by the researcher at MTsN Olak Kemang Jambi, it was found that some of the students still had difficulties in understanding mathematics. The researcher assumed that this problem was caused by the less variation of learning methods which were used before. The students were not willing to ask questions during teaching and learning process. They were also unserious and found difficulties in doing exercises. One of the efforts which was done by the researcher in solving this problem was by applying realistic mathematic education approach in teaching and learning process. This research was aimed to improve students’ activity and learning mastery in mathematic at MTsN Olak Kemang Jambi.

This was a classroom action research which was conducted collaboratively with the teachers of the school.. This research was conducted in three cycles in which each cycle consisted of planning, action, observation and reflection. The subject of this research was the second year students of MTsN Olak Kemang Jambi that consisted of 31 students. In collecting the data, the researcher
used observation sheet, field note and a test. The data then was analyzed descriptively. The result of the research showed that the use of realistic mathematics education approach could improve students’ activity and learning mastery in mathematics at MTsN Olak Kemang Jambi. After applying realistic mathematics education approach, the students had a willingness to answer teacher’s questions, model concrete and abstract problems, solve the problems, give opinions and explain them to the peers, present the result of the discussion and take conclusion. The percentage of the students who had gained the minimum standard of achievement in understanding the concept of mathematics in the first cycle was 29%, and then it improved into 87% in the third cycle. While in problem solving, the minimum standard of achievement improved from 26% in the first cycle into 80% in the third cycle.

M3 - 08 Profile Ability Think Critically Student in Completing Mathematical Problems Based on The Level of Academic Ability

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This research aims to describe profile ability think critically student in completing mathematical problems based on the level of academic ability. Subject in this research are students of the 2nd semester on 2014/2015 academic year who studied at mathematics education of FKIP UIR Pekanbaru who was following lectured Calculus 2. The subject divided by three groups namely students with high skill level, medium and low level. This classification based on value obtained student on the lecture calculus 1. The techniques of collection data in this research is using test and interview. Based on the results of research known that: (1) students on the high level group are generally have good enough the ability to generalize, but have less capability to identified and justified the concept and analyzes algorithms; (2) students on the medium level group have capability of being in general afford to identified and justified the concept, generalize, and analyzes algorithms; (3) students on the low level group are not capable to identified and justified the concepts of, generalize, and analyzes algorithms.

M3 - 09 The Development of an Authentic Assessment in Geometric Subject which is Oriented to Problem Based Learning (PBL)

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Constructivism is a learning philosophy which promotes students to increase their understanding of new ideas. Because PBL is a methodology in which learners are actively builds their own knowledge, PBL philosophy is in essence a constructivist fisolofi. So, the students need to understand some concepts of material specifically math concepts. To get those concepts and understanding, there should be a continuing diagnostic process which leads teachers to determine whether the students have achieved the concepts and understood the knowledge. Through this way, the teachers can step to give feedback before the students have gone too far. Therefore, there should be a development of an evaluation system which is comprehensive and integrated in order to be able to evaluate students’ applicative skills in math specifically in geometric subject. The real form of the evaluation system in this research is an authentic assessment. The purposes of this research are: 1) developing an authentic assessment which is oriented to problem based learning in learning math of geometric subject. 2) Developing structured activities in forms of independent or autonomous tasks, field tasks, presentations, and discussions which lead students to become autonomous, able to communicate, work in groups, communicate their learning outcome, express and defend their opinions.
This research was done through some steps: preliminary study, development and validity. In the preliminary study, there were documentation, field survey, instrumentation to collect data i.e. check list, interview guidelines, and observation sheets; in the development step, there were first draft of authentic assessment which is oriented to problem based learning through constructivism approach; and validity step which is related to product validity by some experts.

The results of this research are: 1) the development of authentic assessment which is oriented to problem based learning in learning math of geometric subject, 2) structured activities which are oriented to independent and autonomous tasks, field tasks, presentations, and discussion which is oriented to problem based learning through constructivism approach.
MATHEMATICS
(M4)
M4 - 01 The Application of Nonparametric Interval-censored Data Procedures in Modelling Time to Get the First Job
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Tracer study is commonly held by many universities to collect the up to date information about their graduates. One of such information is how much time that spent by their graduates to get the first job after graduation day. In this work, we apply a nonparametric method to estimate the survival function of time to get the first job of Sriwijaya University graduates. Because the time to get the first job in this study is interval-censored, Turnbull Non-Parametric Maximum Likelihood Estimation (NPMLE) was used as the estimation procedure. Moreover, we also construct a Cox proportional hazard model for such interval-censored data. The data were obtained from the tracer study that was committed in 2012. There are 637 graduates who participated in the study and six covariates included in the model, that is sex (x1), faculty (x2), job vacancy information (x3), graduation year (x4), considerations in choosing the job (x5), and course (x6).

M4 - 02 Fungsi Terintegral Henstock-Kurzweil Serentak Dan Unifomly Globally Small Riemann Sums (UGSRS) Dari Ruang Euclidean\(\mathbb{R}^n\) Ke Ruang Barisan \(\ell^p\), \((1 \leq p < \infty)\)
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In this paper we discuss Henstock \(\alpha\)-integrable functions from the Euclidean spaces \(\mathbb{R}^n\) into the Sequences space \(\ell^p\), \((1 \leq p < \infty)\). Some Properties of Henstock \(\alpha\)-integrable functions from the Euclidean spaces \(\mathbb{R}^n\) into the Sequences space \(\ell^p\), \((1 \leq p < \infty)\), Definition and some theorems of Henstock Equi \(\alpha\)-integrable functions from the Euclidean spaces \(\mathbb{R}^n\) into the Sequences space \(\ell^p\), \((1 \leq p < \infty)\). Definition and some theorems Uniformly Globally Small Riemann Sums (UGSRS), Definition and some theorems Investigated Equivalensi Henstock Equi \(\alpha\)-integrable functions from the Euclidean spaces \(\mathbb{R}^n\) into the Sequences space \(\ell^p\), \((1 \leq p < \infty)\) with Uniformly Globally Small Riemann Sums (UGSRS).

M4 - 03 Stock Parts Forecasting Using Least Square In PT. Dunia Barusa Lhokseumawe
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Analysis of demand, particularly demand for spare part stock is to measure the current and forecast demand conditions - the condition in the future. Methods least square is a method that is most widely used to determine the equation of trend data. Least square forecasting system to capture the pattern of past data is then used to project the data that will come. Measuring demand now means analyzing the present conditions and previously as a source of information to predict the conditions that will come with the assumption that the past situation will be repeated again in the future and how to forecast the demand for spare part stocks for the future and analyze the needs of the spare parts stock in PT World Barusa. The purpose of the system can allow companies to predict shortages of spare parts and predict stock inventory of spare parts. With the ability of the forecasting system is
expected will be used to measure the current demand and the predicted demand for future inventory stock inventory of spare parts in order to remain stable.

M4 - 04  Stochastic Differential Equation Model to Predict World Population Growth
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In this paper it is studied the application of stochastic differential equation to predict world population growth. The data is world population. Data is simulated using Maple software. The result are that population growth directly depends on population growth rate. The projection using stochastic differential equation similar to predictions published by world health organization (WHO).

M4 - 05  Estimating The Validity of Constructs in Patient Loyalty Model
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The main objective of this present study is to demonstrate the application of structural equation model approach to construct the patient loyalty model of respondents who have got healthcare at Puskesmas in Padang, West Sumatera. All 150 respondents are involved in this study. This study found that patient loyalty is affected by patient satisfaction directly. Meanwhile service quality affect patient loyalty indirectly with patient satisfaction as mediator variable between both latent variables.

M4 - 06  Valuing Employee Stock Options (ESO) Under Employee Forfeiture Rate
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One of the reward which granted by a company to their employees is by giving a chance to be the owner of stocks in the company. Its called by Employee Stock Option (ESO). Employee Stock Option (ESO) is a type of call options which granted to employees of a company for free as a form of compensation to its employees. ESO entitles employees to buy shares of the company within a period of time and certain vesting period. ESO has a difference with the usual options traded, so this is what distinguishes it calculated from the other types of options. In this paper will be used the CRR binomial method (Cox-Ross-Rubinstein) in calculating the fair value of ESO, which applied in several models, which are popular models and the new model. The models are SFAS 123 (R) model, and the Hull-White model, as well as new models that Employee Forfeiture Rate model where in this model has taken into account the employee who forfeit from the company. The forfeiture rate of employee will be reflected along vesting period until the exercise time, which
influence the outstanding stock price. Then the results of this model will be compared with the SFAS 123 (R) model, and the Hull-White model.

At the end of this paper will also be shown the influence of several specific parameters to the ESO’s value. Parameters which observed are volatility parameter, interest rate, dividends and employees forfeiture rate.

**M4 - 07  Green Function as Integral Operator in N-Order Linear Differenterential Equation**

**Media Rosha,** Mathematics Department, Universitas Negeri Padang, e-mail: mediarosha@gmail.com

Solutions of n-order linear differential equations consist of homogeneous and non-homogeneous solutions. A method to determine the non-homogeneous solution is by using Green function. To obtained the Green function, its use the method of variation of parameters. The result of this paper is the general form of the Green function of n-order Linear Differential Equations.

**M4 - 08  The Application of Algebraic Methods in Balanced Incomplete Block Design**

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A balanced incomplete block design contains finite set P with v elements called varieties and a collection of set B consisting of b sets called blocks to qualify: (i). each block contains k varieties, (ii). Each variety occurs in every r blocks, (iii). Each pair of varieties occurs in exactly λ block. In this paper we discuss the use of algebraic method to construct such designs.

**M4 - 09  The Application Of Lattice Paths On The Ballot Problem**

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Lattice paths as one of combinatorics parts has been used a lot in various problems, e.g., ballot problems, compositions, random walks, fluctuations, and queues. In this paper, we will focus on the application of lattice paths on the ballot problem. We also discuss the enumeration of lattice paths and its relationships with the reflection principle.

**M4 - 10  Quiver as Aljabar Visualization**

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In this paper will be discussed on each algebra finite dimension to be seen from a directed graph which called quiver and instead of a directed graph can be defined an algebra with certain conditions. So the algebra which usually abstractive can be seen in real terms after we visualize in a directed graph.
M4 - 11  An Overview of Methods for Increasing the Performance of Genetic Algorithm

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Genetic algorithm is a heuristic search algorithm based on the idea of natural selection that occurs in the process of evolution and genetic operations. One of the important stages in the genetic algorithm is a crossover process. Performance of the genetic algorithm depends on several aspects such as: population size, population diversity, the selection process, the method of crossover, and mutation. Population size also determines the performance as it relates to computing time and accuracy of population and it diversity helps a population adapt quickly to changes in the environment and it allows the population to continue searching for productive niches, thus avoiding becoming trapped at local optima. Selection process also important in Genetic Algorithm relates to choosing the best individu and maintaining a genetic diversity within the population of candidate solutions throughout generations and lastly, the mutation will affect genetic algorithm for prevent falling all solutions in population into a local optimum of solved problems. In this paper, we present the results of various studies relating to various aspects that can affect the performance of the genetic algorithm.

M4 - 12  Forecasting Oil Production Using Time Series Model

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The decline rate in oil production is based on a single well in a closed system, generally. In reality, oil production wells in the same reservoir. If the wells are producing at the rate or pressure is not uniform, there will be a draining system that is not uniform over the boundary dominated flow conditions. Furthermore, it may happen that new wells affect the drainage area of the older wells. Therefore, we need a model of multi-well decline curve analysis which includes the interaction between wells. This study aims to forecast model of the rate of oil production on wells with multi-system interaction between wells through the approach of a predator-prey-like models. Predator-prey system of multi wells represented as VARIMA model on time series analysis. Model parameters are estimated simultaneously using Gauss Newton method. Expected production forecasting models resulting from the proposed model would be more realistic to approach by Vector Autoregressive Integrated Moving Average (VARIMA), and will contribute significantly to the methodology of petroleum production forecasts.

M4 - 13  Optimization of Production Planning Using Goal Programming Method (A Case Study in a Cement Industry)

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Production planning plays an important role for a manufacturing industry as it relates to the manufacturer's plan to meet product demand, profit achievement, and use of resources. An improper planning can lead to costs that are not expected. This study aimed to determined the optimal production, to estimated total profit, and to estimated processing time and raw material usage. The study conducted on one of cement industry in Indonesia. The analysis was divided into 3 stages. The first, estimating monthly demand of cement type I and II for 2015. In this case, the linear regression method was chosen based on the smallest error indices. The second, developing a model of goal programming (GP) to optimized four goals of (production volume, total profit, utilization of processing time, and raw materials usage). The GP model was solved by Lingo 10.0 software. The third, interpretation of GP solution. The results indicated the optimal production of cement type I and type II averagely reached 87.961 tons and 89.706 tons per period would be able to achieved. The average total profit of Rp. 61.290.933.000 per period producing two type of cements would be achieved. The average utilization rate of processing time capacity reached 87.2% per period. There was an excess availability of klinker averagely reached 1.28% per period. The limestone usage averagely reached 0.003% (excess) and 0.05% (shortage). The gypsum usage averagely reached 0.22% (excess) and 0.02% (shortage) per period. The pozzolan usage averagely reached 0.48% (excess) and 0.05% (shortage) per period.

M4 - 14 Spectral Method of A Boundary Value Problem for Korteweg-de Vries Equation

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Solution for boundary Value problem for Korteweg-de Vries equation has been discussed in several ways especially for its numerical approximation like finite-difference method, Chebyshev method, etc. This Paper discuss about the numerical solution of a boundary value problem for KdV equation that is approximated by spectral methods. The equation system is transformed into spectral space and then we solve it numerically in the spectral space. As the result, the comparison of the solution with exact solution for a familiar case is very small.
PHYSICS
EDUCATION
(P1)
P1 - 01  The Effectiveness of Mechanics Handout Integrated By Volcanic Eruption Material To Creative Thinking Ability

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This experiment is based on the problem that student learning outcomes are still under standard. It aimed to investigate the effectiveness of mechanics handout integrated by volcanic eruption material to creative thinking ability. This type of research is a Quasi Experiment. Design of research is randomized Control Group Only Design. The population of research is all the student of grade XI in SMA N 1 Padang enrolled in the academic year 2013/2014. The sample is selected by cluster random sampling technique; the sample is consisted of XI Science 6 as experiment class and XI Science 7 as control class. The data of research is cognitive physics learning outcome. The technique of collecting data is essay. Analysis of data uses two similarity average tests. The conclusion of research is hypothesis that there is significant effectiveness of mechanics handout integrated by volcanic eruption material to the creative thinking ability can be accepted on the real level of 0.05.

P1 - 02  Physics Learning Oriented Content Complexity and Cognitive Process for Improving Student Scientific Competence on High School in Padang

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Learning physics in high school requires that students have a comprehensive knowledge, through cognitive processes adequately, which refers to the scientific approach, thus competence developing optimally. Based on that, it is developing model physics learning oriented on the content complexity and cognitive processes such as those developed by Anderson & Krathwohl, to improve students physics competence in high school.

The model developing process used ADDIE model was begins with a preliminary study in evaluation descriptive that held for 2 months (March to April 2015) at 4 high schools in Padang that implement the curriculum of 2013. The research instrument is based on 4 dimensions of knowledge and 6 levels of cognitive process, totally 24 items. A competency test is done to 12 students of class X that has rank 1, 2, and 3.

The results of preliminary studies conclude that the quality of the achievement of students physics competence in Padang schools is still low, in terms of the content complexity and the level of cognitive processes that shown by the majority is still at the level of 1, 2, and 3, while for level 4, 5, and 6 are still very few and incline not appear. The study recommendation is needed to develop a model-oriented learning on the content complexity of and cognitive level processes to improve the students physics competence in Padang high schools.
P1 - 03 Development of Authentic Assessment for Supporting the Inquiry Learning Model in Basic Electronics 1 Course

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Implementation of authentic assessment gives potency and benefit in learning process. This assessment type is conducted comprehensive both process and outcome. For this reason, the integration authentic assessment is important in a learning model. The objective of this research is to develop authentic assessment that suitable with inquiry learning model and determine its validity, practicality, and effectiveness. This research uses research and development (R&D). R&D is research method which is used to produce certain product and to test effectiveness of that product.

P1 - 04 Influence Model of Learning and Thinking Style Against Physics Problem Solving Ability of Students Grade XI IPA SMAN 22 Makassar

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This research aims to determine the effect of learning models and styles of thinking against physics problem solving ability of students of class XI IPA SMAN 22 Makassar. This research is a quasi experimental. The population in this research is the overall students of class XI IPA SMAN 22 Makassar 2014/2015 academic year consisting of 4 classes with the total number of learners are 160. The determination of the sample using simple random sampling technique and was elected class XI IPA3 and XI IPA4. The design was a 2 x 4 factorial design. Instruments in this study was a questionnaire-style thinking, problem solving ability test, and observation sheets feasibility study model. The data obtained were analyzed using descriptive statistics and inferential statistical analysis using GLM Univariate analysis. The average value of the physics problem solving skills of students in a class taught by problem-based learning model and guided inquiry, namely 80.17 and 80.90. Inferential statistical analysis of the results obtained significance value 0.751 > α = 0.05. That is, there is no influence learning model to the physics problem solving skills of learners. The average value of the physics problem solving skills of learners with concrete sequential thinking style, abstract sequential, concrete random and abstract random row is 80.34; 85.45; 75.65; and 80.14. Inferential statistical analysis of the results shows that the significance value 0,000 < α = 0.05. That is, there is the influence of the style of thinking of the physics problem solving ability of students. Inferential statistical analysis results show the significant value learning model * thinking style of 0,025 < α = 0.05. That is, there is an interaction between learning models and styles of thinking in effect physics problem solving ability of students.

P1 - 05 The Development of Authentic Assessment for Problem Based Learning Model in Learning Physics for Senior High School

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Curriculum 2013 has been implemented in targeted schools in order to improve the quality of education in Indonesia. However, there has been no teaching materials that can be used as a guidance to learn in school specifically for applying scientific approach as its implementation. It
used the same assessment although it used different learning model. This study aims to make assessment on the problem based learning model in physics fr senior high school in Padang valid and practical. This type of research is the development of research. The model and development procedure using 4-D consists of define, design, development and the disseminate phase. Define phase consists of curriculum analysis, formulating the indicators, analysis of learners, analysis of the concept and the analysis of learning objectives. The design phase consists of designing assessment model problem based learning. The development phase consists of validity test and limited test to students of SMAN 2 Padang and the assessment of practicalities.

P1 - 06 Development of Multiple Representation-Based Teaching materials introduction to Solidstate Physics at Physics education of Sriwijaya University

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Has been successfully developed multiple representations based-teaching materials introduction to solid state physics by very valid and practical. Research development with Rowntree development model. Rowntree development model consisting of three stages, namely the planning stage, the development stage, and evaluation stage. At the evaluation formative assessment presented by tessmer evaluation consists of 5 stage, (1) self evaluation, (2) experts review, (3) one-to-one evaluation, (4) small group evaluation and (5) field test. Data collection techniques using validation expert, one-to-one evaluation, anad small group evaluation. From the expert review obtained the percentage of the average the results by 82 percent (category of very valid). At the one-to-one evaluation obtained the results of the response of students on the use of teaching materials to 84 percent. By the experiment of small group evaluation, the results of the response of the average student on the use of teaching materials increased from 84 % to 87,11 % (categories of very good).This means that of teaching materials developed is considered to be very practical. Thus, research based on the results he got that of teaching materials developed is considered to be perfectly valid and practical, so as to be used as teaching materials additional a course called introduction to solid state of physics in Physics Education of Sriwijaya University.

P1 - 07 Development of Teaching Materials Based Scientific Approach for Subject Matter of High School

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Has conducted research on the development of a scientific approach based teaching materials for high schools. One goal is the development of teaching materials to improve the quality of education and learning in high school physics. In doing so, the study begins with the identification of problems at school, then designing teaching materials based Scientific Approach containing competence to be achieved, supporting information, learning materials, instructional video, animation, student worksheets and evaluation. To test the validity of teaching materials based Approach Scientific research is conducted Development of model 4-D (four D model) with the phase; define, design, development ), and dissemination. Based on the results of the validation made teaching materials, are generally good category. Teaching materials are designed so that can already be used in high school.
P1 - 08 Developing Integrated Science Instructional Media with Sequenced Model on the Concepts of Particle Theory and Heat Transfer

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The research aims to develop integrated science instructional media with sequenced model on the concepts of particle theory and heat transfer. There are ten models of curriculum integration in Fogarty’s *How to Integrate Curricula* (2009), one of which is sequenced model. Thus, this research adopted sequenced model by means of integrating two concepts that should be taught sequentially in an instruction, but they constitute two branches of different disciplines. The two branches of disciplines in this instructional media development comprise chemistry on the concept of particle theory and physics on the concept of heat transfer. The research itself is categorized into research and development, as it developed several instructional media, including teaching materials, lesson plans, worksheets, and tests of student learning outcomes. In its media development, the research employed 4D model, which stands for “define, design, develop, and disseminate.” The end products of this research are valid instructional media with good category and applicable in teaching and learning. The research recommends that future research develop instructional media adopting other models or focusing on different topics in order to be made reference by future researchers or students in designing integrated science instructional media.

P1 - 09 Effectiveness and Efficiency of Mobile E-Learning System in Thermodynamics Study

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Basically, implementation of e-learning system has some disadvantages. Mobile e-learning system is an application for overcome weakness the e-learning system. The aims of this article are measuring effectiveness and efficiency of mobile e-learning system in learning process. Mobile e-learning application developed using android programming. The mobile e-learning application installed to student’s smartphone or tablet that can be used for access lectures of study. The data collected using questionnaire and test. According the data, mobile e-learning system got very good level of effectiveness and efficiency. Based on data analysis can be concluded that mobile e-learning system effective and efficient applied in learning process.

P1 - 10 The Effectiveness of Constructivist-Based Handouts for Fundamental of Physics

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The implementation of learning activities that can increase students’ activities and critical thinking skills in STKIP PGRI are still lacking. The learning materials provided less support and motivate students to reconstruct their own knowledge. Therefore, it is important to develop valid and practical constructivist-based handout for fundamental of physics subject. The handout that has been declared valid and practical need to be tested to evaluate its effectiveness in learning.

This type of research is the development research (research and development) using the model proposed by Plomp. The stage of the research conducted in this study is the assessment phase. In
this stage, the researcher did testing the use of handouts in learning. This research data was obtained through observation of students’ activities learning outcomes.

The result of effectiveness test and learning outcomes showed that the handouts was effective to use. Thus, the fundamental physics handouts produced can be used in learning.

P1 - 11  Physics Education Students’ Conceptions on Active Forces and Action-Reaction Pairs

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The purpose of this research was to investigate student-teachers’ conceptions on active forces and action-reaction pairs. The instrument used was made up of 13 multiple choice questions with 5 options selected from the FCI (ver. 1995). It was administered to physics education department students of faculty of teacher training and education of a state university in Indonesia. The qualitative data were also collected through interviews and observations performed during the learning process. The research findings revealed percentages of seven common misconceptions on active forces based on taxonomy of misconceptions probe by FCI, i.e. 1) only active objects exert forces (17.81%), 2) the motion of an object representatives of active forces acting on the object (63.01%), 3) no motion means no force (50.68%), 4) velocity is proportional to applied force (40.41%), 5) acceleration of an object implies increasing force acting on the object (35.62%), 6) force causes acceleration to reach terminal velocity (15.53%), and 7) active force wears out (28.77%); and two misconceptions on action-reaction pairs, i.e. 1) greater mass exerts greater force (33.22%), and 2) most active object produces greater force (47.49%). The results of the research showed that the Indonesian physics education students held strong misconceptions on active forces and action-reaction pairs. The result of this research are similar with the findings of related studies in other countries.

P1 - 12  Modification Of Colorado Learning Attitudes about Science Survey (Class)

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The aimed of this study is to modify and validate The Colorado Learning Attitudes about Science Survey (CLASS) to assess students’ beliefs about physics and learning physics. For the purpose of this study, CLASS was translated into Bahasa Indonesia and was examined by physics education and Indonesian language experts to avoid ambiguity in the process of translation. Originally, CLASS has eight categories, namely (1) real world connection, (2) personal interest, (3) sense making /effort, (4) conceptual connections, (5) applied conceptual understanding, (6) problem solving general, (7) problem solving confidence, (8) problem solving sophistication. After administering to 530 senior high school students, an exploratory factor analysis (EFA) produced 25 items with factor loadings greater than 0.40 which support three categories, namely (1) sense making/effort, (2) conceptual understanding, and (3) problem solving.
P1 - 13  The Influence Of Students’ Worksheet Life Skill Oriented and Early Ability Toward the Students’ Physics Prior Outcome in Learning Science Environment Technology Society (Sets)

Wahyuni Satria Dewi, Universitas Negeri Padang

A factor encountered learning is that students do not have the life skills that are needed to be in the community. The real impacts of these problems are the lack of student learning outcomes, whether in the cognitive, affective and psychomotor. This research aimed to investigate the influence of Students’ Worksheet (LKS) life skill oriented and early ability toward the students’ physics prior outcome in learning Science Environment Technology Society (SETS). This research was quasi-experimental research design with research using Treatment by Block 2x2. The populations of the research were all students of class X SMA N 1 Koto XI Tarusan at the second Semester of 2012/2013 academic year. Sampling technique is cluster sampling, so the X2 class was selected as the experimental class that uses LKS life skills-oriented and class X3 as a control class that uses non-life skills worksheets. The data of this research were taken in the form of prior knowledge data, cognitive, affective and psychomotor. The result of the research indicate that first, there is an effect LKS life skills oriented towards learning outcomes. Second, there is influence oriented life skills worksheets for high ability students’ start on learning outcomes. Third, there is influence LKS life skills oriented for low ability students start on learning outcomes. Fourth, there is no interaction between the use of oriented life skills worksheets and student’s early ability influences the students’ physics outcomes.

P1 - 14  Development of Physics Learning Materials Contain Intelligence Comprehensive for Implementation the New 2013 Curriculum in Senior High School Grade X

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In accordance with the general guidelines of learning process in new 2013 curriculum, Both directly and indirectly learning are integrated and not separate. The purpose of directly learning is to develop basic competences from the third and fourth core competencies, whereas the indirectly learning is becoming of basic competences of first and second core competencies as nurturant effect of directly learning. This means that the learning process is done for developing and becoming the holistic competences or intelligence comprehensive of students. Learning materials is one factor to impact the achievement of outcomes through learning process. It will be to support the achievement of learning outcomes if the content of it contains knowledge, skills, religious and social attitudes (intelligence comprehensive). This research aims for development of a physics learning materials contain intelligence comprehensive which valid, practical and effective to implement the new 2013 curriculum in senior high school grade X. There are three products produced from the research and development with several validity values such as printed teaching materials about 88,71, student worksheet about 86,73 and handout about 86,46. Moreover, the practical value of products are 88,90 from teachers and 82,47 from students for the printed teaching materials, 89,07 from teachers and 87,69 from students for the student worksheet, and 88,47 from teachers and 81,53 from students for handout. Furthermore, all product are effectively used in learning.
PHYSICS
(P2)
P2 - 01 Optimization of Least Squares Methods Smooth Constraining Using Occam’s Inversion Geoelectric Resistivity Dipole-Dipole Configuration for Estimation Slip Surface

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The volumes of the landslide depend on the depth of the slide surface. The depth of the slide surface can be predicted by using the least squares inversion methods of data geoelectrical. Method of Least Squares Inversion of the data Geoelectrical cannot get smooth results. Based on the above, the aims was optimalization least-squares smooth constrain inversion methods with Occam’s inversion for geoelectrical data and to determine the depth and tilt angle of the slide surface in Bukit Lantiak Padang. This exploratory study was use the method Geoelectrical resistivity Dipole-Dipole configuration. The depth and tilt angle of the slide surface in Bukit Lantiak Padang was interpreted by combined Occam’s inversion with least-squares smooth constrain inversion methods. The type of slip surface is translation slip with 33.450 tilt angle and 19.3 meters in depth. Research show that the result interpretation by used combined Occam inversion with least-squares smooth constrain inversion methods more sharpness than least-squares smooth constrain inversion.

P2 - 02 Determination of System Dynamic Characteristics Based on a Serial RC Circuit Model

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An inverse calculation method has been developed in order to get values of resistance \( R \) and capacitance \( C \), and also might be change with time, based on time series data of voltage sources \( \varepsilon \) and capacitor charges \( Q \) (or electric current \( dQ/dt \)), using a simple serial RC circuit model (RSRC model)

\[
\frac{dQ}{dt} = -\frac{1}{RC}Q + \frac{\varepsilon}{R}
\]

by using several values of \( C \) resulting from extreme conditions of \( Q \) and applying the continuous cyclic boundary condition to the function representing the change of \( C \) above. Resulting calculation of the method for three samples of “The \( C \)-function” and the periodic voltage sources

\[
\varepsilon(t) = \varepsilon_A + \varepsilon_B \sin\omega t; \quad 0 \leq \omega t \leq \pi \text{ and } \varepsilon(t) = \varepsilon_A; \quad \pi \leq \omega t \leq 2\pi
\]

where \( \varepsilon_A, \varepsilon_B, \) and \( \omega \) are constants, gave pair values of \( R \) and \( C \) which are similar to the ones obtained from the identical standard problem using the standard solution of the RSRC model. Applications of the above model and method for the study of atmospheric heating (cooling) processes related to the atmosphere-surface thermal interaction are complement to the discussion in this paper.
P2 - 03 Experimental Study On Fiber To The Home Network Characterizations In Optical Test Solution

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This paper proposes an experimental study for fiber to the home (FTTH) network that uses 1550 nm and 1625 nm wavelength band light. We designed the system and network test-bed to measure optical power level or loss of optical power of each type of device or optical components in the Lab Network of ITP by using an Optical Time Domain Reflectometer (OTDR). The prototype of the device is fabricated and which achieves the target characteristics and reliability. In addition, it is confirmed that the prototype could detect fiber fault at 10.5222 km with system loss 18.21 dB within 13 minutes by setting the acquisition parameters in OTDR module.

P2 - 04 Magnetic Properties And Heavy Metal Content Of Leachate Sludge In Waste Landfill, Air Dingin Padang, Indonesia

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Magnetic parameters can be used as a proxy for environmental pollution, including pollution by leachate sludge. This study aims to determine the value of magnetic susceptibility, type of magnetic minerals and heavy metals content of the leachate sludge in waste landfill Air Dingin Padang as indicators of environmental pollution. Leachate sludge samples taken from some of the leachate pond, and conducted a series of measurement using magnetic susceptibility, IRM and XRF methods. The results showed that the sludge leachate samples have significant susceptibility values ranged from 122.7 to 2132.7 (10^-8 m^3/kg), with an average value of 630.3 (10^-8 m^3/kg). The susceptibility values indicate the presence of heavy metals in the sludge leachate. The dominant magnetic minerals of sample is magnetite. XRF results obtained from the content of heavy metals in sludge samples of leachate is Ti, V, Cr, Mn, Fe, Co, Zn, Zr, Nd, Yb, Rh and Eu. Heavy metal is the dominant iron (Fe) with a composition range of 14% - 56% and averaged 39.2%.

P2 - 05 Monitoring Technology Development Geoelectric Time-Lapse to Monitor The Prone to Landslide In Padang Using Methods Geoelectric Time-Lapse Resistivity Inversion in Wenner And Schlumberger Configuration

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Recently, the landslide disasters often hit the city of Padang. In order to overcome the landslide problem, it is necessary to do a comprehensive research and to observe the physical appearence and the structure of the subsurface rocks in areas prone to slide. This research aim to identify the presence of sliding plane in areas prone to landslides. Data obtained by using the Wenner and Schlumberger configuration are processed with the help of RES2DINV software. Based on the resistivity values obtained on Track 1 is identified, there are 4 types of rock constituent that is Clay,
Sandstone, Limestone, and Andesite. Interpretation of the results showed in Track 1 are sliding plane. Geoelectric Time-Lapse Resistivity Inversion Method done for two sets of data, geoelectric measurements at an early stage and second stage. The magnitude of change in resistivity to both sets of data on average almost the same at all points of measurement which is around 53.6 % in Wenner Configuration and 56.6 % in Schlumberger Configuration, except on certain points, which indicates a greater percentage.

P2 - 06 Design of Experiments Set to Determine the Coefficient of Kinetic Friction on Collision of Two Objects

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One of many problems in physics education at high school is unavailability experimental tools for some physical concepts, particularly for collision concept. This final project designed an experimental equipment to explain collision two objects. The experimental equipment consists of a simple pendulum with a metal sphere clamped by a rigid stand to be released and then the metal sphere hits a block that initially at rest on a railway track. The block moves and finally stops because there is a kinetic friction between block and railway track. This equipment can be used to determine coefficient of kinetic friction for a variety of materials.

Analysis of the first experimental results are coefficient of kinetic friction for steel on steel (.), aluminum on steel () and glass on glass (). The difference between the experimental results and literature data is less than 6%. This indicates that the equipment is accurate enough to determine coefficient of kinetic friction between two objects. Second, the experimental data give a relation that the displacement of the block is linearly comparable with elevation of the sphere and inverted comparable with mass of block and cosine of angle of simple pendulum.

P2 - 07 Effect of Calcination Temperatures on Phase Transformation and Crystallite Size of Granite Powder

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Granite powder was prepared from granite rocks from Solok, Indonesia. The samples was dried and calcined for 1 hours at temperatures from 500 °C, 700 °C, 800 °C, 900 °C and 1000 °C. Phase transformation and crystallite size of the calcined powders have been investigated as a function of calcination temperature by room-temperature X-ray diffraction (XRD). It is seen that the quartz and albite phase of granite samples was successfully obtained. With increasing calcining temperature, another phase also appears as feldspar, biotite, tourmaline and coesite. Crystallite size of quartz phase decreased from 63.85 nm to 56.20 nm and no there is a change which means for albite phase.
P2 - 08  Mapping the Indonesian Upper Mantle with Multimode Surface Waves
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Indonesia and its surrounding region are one of the most complex tectonic regions in the world, where several major and minor plates are interacted. It is characterized by intensive seismicity and volcanism originated from several subduction zone. To understanding the complexity of this area, we used both regional and global seismic data to image three dimensional shear-wave structure of the upper mantle of the Indonesian region with resolution complementary to previous studies. Following the three-stage multi-mode surface wave tomography method incorporating finite-frequency effects, we measured dispersion curves for both Love and Rayleigh waves, using automated multi-mode phase speed measurements. The final 3-D model shows large variations in S-wave velocity of ± 7 percent in maximum, and reliable results are obtained down to at least 500 km. We image an intriguing low-velocity anomaly in the depth range 70 - 100 km beneath the Sunda land and Banda Sea. Substantial variations in isotropic shear velocity in the uppermost several hundred kilometers of the mantle are found to correlate well with surface tectonic features.

P2 - 09  The Optimization of Calcination Temperature of Pensi (Corbicula Moltkiana) Shells to Obtain Calcite-CaCO₃
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Calcite-CaCO₃ is one of the pioneer crystals in nonlinear optics. In this paper we report the synthesis of calcite-CaCO₃ from Pensi shell waste by optimization of calcination temperature. Various calcination temperature of synthesis were varied to identify the optimum one. Pensi shell waste has been taken from the Maninjau lake then washed and dried. Next step is sintering for 24 hours at a temperature of 105°C to remove water content. Pensi shells powder then sieved using a 200 mesh sieve and conduct the calcination with the calcination temperature variation are; 300°C, 320°C, 340°C, 360°C, 380°C, and 400°C with a heating holding time for each calcination temperature is 2 hours. All sample are characterized by X-Ray Fluorescence and X-Ray Diffraction. We found that calcination temperature causes the phase of CaCO₃ from pensi shell waste changed from the aragonite to calcite associated with changes in the crystal structure of CaCO₃ from orthorombic to rhombohedral. Phase change of CaCO₃ during calcination will be explained in detailed. The optimum value of calcination temperature is obtained at 400°C, which at this temperature all phases of the CaCO₃ are calcite.
A Synchronous Sub-Arrays Circularly Polarized Microstrip Antenna for Bisar Onboard UAV

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A circularly polarized microstrip antenna for bi-static SAR onboard UAV has been investigated. The both sense of the circular polarization left-hand circularly polarized (LHCP) and right-hand circularly polarized (RHCP) are can be achieved in experimental and simulation. The 2x2 sub array antenna operated in 1.176 (L-band) with novel proximity synchronous feed method has been designed, fabricated, and evaluated to show the characteristic of the antenna. The measured result gives the axial ratio bandwidth (<3dB) of about 28 MHz (2%), which consistent with the simulated result of about 27 MHz (2%). These results satisfy the specification for our BiSAR system installed onboard UAV.

Development of 2D Vibration Detector Using Fluxgate Sensor Based on Personal Computer

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The development of 2D vibration detector using fluxgate sensor based on personal computer has been done. This detector can be operated for both vertical and horizontal axist. In previous work, the vibration detector has been developed for limited 1D. The detection system consist of hardware and software part. The hardware part, consist of fluxgate sensor circuit and interfacing. Digitalization of analog fluxgate sensor output is done by using ADC in microcontroller. The vibration data is processed using software developed with visual basic (C# language) dan MPLAB X IDE. The processed data is presented in personal computer display with 2D graph as function of time.
CHEMISTRY
EDUCATION
(C1)
C1 - 01  Student’s Perception of Mathematics and Science Department of Biology Education Program Toward Basic Chemistry Course at The University Mahaputra Muhammad Yamin Solok

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The study was conducted to determine the student’s perception of Mathematics and Sciences Department of Biology Education Studies Program toward learning basic chemistry courses at the University Mahaputra Muhammad Yamin Solok. This research is a descriptive study with 72 students as sample of Biology Education who was taking Basic Chemistry course from semester 2009/2010 until 2012/2013. Based on the results of analysis data, it can be seen that the desire to learn is good (average of 3.55), the desire to get a good value is good (average 3.17), perception of lecturer is excellent (average 4.14), effort to learn is good (average of 3.32) and the student’s interest is good (average 3.98).

C1 - 02  The Development of Guided Inquiry Based Worksheet for Laboratory Work on Colloidal System for Senior High School Students

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Research and Development (R&D) study was done to create an instructional material on topic of colloidal system for senior high school students. The main goal was to produce guided inquiry-based worksheet for laboratory work that is valid and practical to be used in chemistry instruction in senior high school. Model of development was 4- D models, comprises four stages including: (1) defining, (2) designing, (3) developing, and (4) disseminating. This research was performed in SMAN 14 Padang, yet limited to developing stage. Kappa formula was used to examine validity and practicality of the product. Worksheet was valid in terms of content, language, graphics, and construct. The mean score of kappa moment for validity was 0.84. Mean score for practicality was 0.80 (for teacher) and 0.93 (for students). Analysis showed that 90% students completed the worksheet. In general, worksheet on colloidal system topic produced had high validity and practicality.

C1 - 03  The Profile Needs Analysis of Learning Chemistry-Oriented Life Skills for High School Students

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Learning in the context of the development of life skills should reflect the various life skills students need to be able to live in the community. This study aimed to describe the results of the analysis of learning needs oriented life skill. In addition, this study is the result of a study chemistry teacher competence. The subjects were 15 teachers who are members of the MGMP chemistry Chemistry Bungo. Questionnaires were used to collect the data in response from teacher chemistry for learning chemistry. The interviews are used to collect data experience high school chemistry teacher in Bungo district. Analyzed using qualitative description. Results of this study are profiles need life skills integrated with learning chemistry. Student needs to achieve 89% personal skills. Student needs to achieve 85% of social skills. Student needs to achieve 77% of vocational skills. Needs students to achieve academic proficiency 86%. Skills that are included in life skills is a unified whole.
C1 - 04  The Development of Problem Based Learning Worksheet on Reaction Rate for Senior High School Students

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The goal of this research is to produce a student worksheet based on problem based learning and reveal the practicalities on the rate of reaction matter. Student worksheet is based on problem-based learning cycle, namely: the problem, the core question, inquiry, problem solving, conclusions, strengthening the concept, and exercises. The type of this research is Research and Development (R&D) that uses four D models (4-D models). LKS development using phases: (1) define (2) design (3) develop and (4) disseminate. This study is limited to the development stage. Worksheet developed validated by 5 validator and test the practicalities by 3 chemistry teachers and 27 students of XI IPA at SMAN 9 Padang. Based on students' test the practicalities of the test result obtained the average value of moment kappa of 0.81, with a very high level of practicalities, while at the moment kappa the teacher obtained 0.84 with the practicalities of that is very high level. Based on the results it can be concluded that worksheet based on problem based learning on rate of reaction matter has a very high practicalities level.

C1 - 05  The Effect of E-Learning on Chemistry Learning Outcomes In Indonesian Education System: A Meta-Analysis

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The use of e-learning in teaching and learning process is a relatively new phenomenon in Indonesian education setting. Yet, studies on its implementation are continually growing. Literature search on Indonesian Publication Index and Google Scholar from 2015 and earlier revealed 49 studies on the implementation of e-learning in chemistry instruction. These papers were then condensed to 18 based on inclusion and exclusion criteria to find papers that investigated the effect of e-learning on chemistry learning outcome, which then further condensed to nine papers that compared learning outcomes e-learning and conventional instruction and gave ample data for effect size calculation. Analysis showed that e-learning resulted significantly higher learning outcomes than did conventional method. The weighted mean effect size for nine studies was 1.08 with standard error, SE of 0.08 and 95% confidence interval of 0.92 to 1.24. This study analyzed heterogeneity and moderator variables to get general pattern of the effectiveness of e-learning on chemistry learning outcomes.

C1 - 06  Chemical Learning Media Using Android Application

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Learning Media based chemical chemistry triangle using android application for the electrochemical material is one of alternative media that can be used for independent study for students. This research is motivated because of the unavailability of chemistry learning media using android application that can help students learn independently in understanding abstract concepts in particular for electrochemical, electrolyte and non electrolyte materials. This study aims to produce
instructional media based chemical chemistry triangle using android application for the electrochemical, electrolyte and non electrolyte materials and test the validity and practicalities of learning media generated. This type of research is the development of research or Research and Development (R&D) by using a 4-D model of development. The instrument of this research is a questionnaire consisting of validation sheets and sheets practicalities. Validation sheet filled in by 8 validator which is composed of four professors and four chemistry teachers. Practicalities sheet filled in by 25 students of SMAN 1 Gunung Talang and SMA 7 Padang and than 10 chemistry teacher. Data from the questionnaire validity and practicalities were analyzed using kappa moment. Results obtained by analysis of the validity of an average value of 0.87 with the validity of the very high category, while the average value of 0.91 practicalities of teachers and students 0.83 with practicality very high category. Based on these data it can be concluded that chemical-based media learning chemistry triangle android application uses very valid and very practical to use as a learning medium for the electrochemical, electrolyte and non electrolyte materials on SMA.

C1 - 07 Profiles Early Generic Skill Prospective Teacher of Chemistry in Jambi University

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Descriptive study was conducted analysis of the profile of the generic capabilities initial prospective teachers in basic chemistry lectures. 45 research subjects include chemistry student teachers Edinburgh University at the start of the 2nd half who took a course of basic chemical 2. The instrument used was a questionnaire has been validated. Among other benefits of research as a foundation to create learning programs that develop basic chemical generic skills. From the research found that the initial generic capability profiles student teachers in basic chemistry lectures covering generic skills profile modeling is relatively low (54.0), inference logic low (40.7), and the causal low (45). Thus, in general, when the basic chemistry lectures 2 will be implemented, the students already have generic skills, but still relatively low (mean = 46.3) thus needs to be improved through the development of device-oriented lectures on generic skills and the integration of the generic skills in the basic chemistry lectures 2.

C1 - 08 Design And Implementation of Chemistry Triangle Oriented Learning Media on Hydrocarbons

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Chemistry learning should be displayed with 3 chemical representations which are macroscopic, microscopic and symbolic. These made students easily to learn chemistry. Macroscopically, chemical phenomena can be studied by students through laboratory work, but it was sometimes not done at schools. Microscopic representation can be presented in animated form. One of the alternatives that can be done to help students understand the concept of hydrocarbon material is Chemistry Triangle-oriented learning media, This Multimedia presents the concept of chemistry with the three types of representation, namely, the macroscopic, microscopic, and symbolic. Learning media can enhance students' motivation and be enable students to learn independently. The aim of this study was to design the valid and practical Chemistry Triangle-oriented learning media and revealed the impact of the use of the media to the learning outcomes of students that suitable to low, medium and high skill level. This experimental study was started from designing
Chemistry Triangle-oriented instructional media, doing validation and testing practicality of the media. This valid and practical media was used to high school students low, medium and high skill level. There were three senior high schools chosen as experimental class. Achievement test were analyzed by using t-tests and two-way ANOVA.

Results of this study showed that the learning outcome of students using Chemistry Triangle-oriented learning media significantly higher than students who learned without using media. Chemistry Triangle-oriented learning media is suitable for students who are capable of low, medium or high ability. There is no interaction between the use of instructional media and chemical capabilities of students in influencing their learning outcomes.

C1 - 09 Design and Validity Kit Forelectrochemistry at Xii Class of Senior High School

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In Education of Grade Curriculum, a teacher must be creative and innovative in preparing each item based on environment, facilities, and student’s condition at school. A teacher must be able to develop lesson media to get response on student’s thinking activities. Lesson media is an important factor in learning process. The purpose of this research is to develop lesson media Kit and experiment worksheet for senior high school to be valid. The type of this research is Research and Development by using development model by Gustafson & Branch. This development model applied system approach principles. It consisted of five steps. They were analysis, designing, developing, evaluating, and implementation. In this research, lesson media is just developed until developing step. Analysis step was curriculum analysis, it consisted of curriculum analysis and student’s analysis. In designing step was done planning of lesson media. In developing step, lesson plan was planned or designed then it was validated by validators from Chemistry Department and validator from education evaluation. Kit for electrochemistry was revised based on the recommendation and correction from validators. The data analysis was processed by statistics descriptive qualitative for validation lesson media by validator. Based on evaluation of validator, media is categorized as valid at competency of concept of oxidation-reduction and electrochemistry in technology and daily activities.

C1 - 10 Implementing Contextual Teaching Strategies In 2013 Curriculum for Colloid Systems Topic

Suryelita 1, Yoga Amarta 2

Contextual teaching strategies is a teaching strategy that can help students to construct and to understand the concept and link it with daily life. This research is to show the influence of implementing contextual teaching strategies in 2013 curriculum on student learning outcomes for colloid system topic. This research is a quasi-experimental research with design is Randomized Control Group Posttest-Only Design. The population was all the students of XI MIA class SMAN 1 Lubuk Alung school year 2014/2015. The sampling technique used was cluster sampling in which XI MIA 6 as an experimental class and XI MIA 4 as the control class. Both of class using curriculum 2013 with scientific approach. In experimental class, learning process is using contextual learning strategy with REACT steps, while the learning process in control class using 5M steps. This research data is learning outcome of students experimental and control class in the cognitive domain gained from the value of the final test. Results of experimental class learning applying contextual teaching strategies gained an average value 70.26 while the control class by learning...
without using contextual teaching strategies has an average value of 64.23. From analysing data show that both classes are normally distributed and don't have homogeneous variant, so to test the hypothesis use t' test. t' values obtained by 2.66. Testing criteria is if value t' > 2.04. This means t' > 2.04, the research hypothesis is accepted. It can be concluded that the application of contextual teaching strategies influence on student learning outcomes. Student learning outcomes after applying contextual teaching strategies significantly higher than the results of learning without contextual teaching strategies in colloid system topic SMA Negeri 1 Lubuk Alung.

C1 - 11 The Development of Buffer Teaching Material in The Form of Module-Based Discovery Learning for Chemistry in Senior High School

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This research prepared teaching material based on discovery learning that one effort of techers in implementation of 2013 curriculum. The research goal was to produce teaching materials in the module form of buffer solution that valid and practical based on discovery learning. This was Research and Development (R & D) by using a 4-D model which consists of four stages: (1) define, (2) design, (3) develop and ( 4) disseminate, yet limited to develop stage. The research instrument was a questionnaire in the form of sheets of validity and practicalities. Validity sheet was filled by 4 lecturers and 3 chemistry teachers. Practicalities sheet were filled out by three teachers and 25 chemistry XII grade students of SMAN 1 Lubuk Alung. Data were analyzed by using kappa moment. The validity of the test results was obtained by the average value of the moment of kappa was 0.74 (high validity). The test results on the practicality of the students obtained an average value was 0.83 kappa moment (very high practicality), while the teacher was obtained is 0.74 (high practicality). Based on the results of this study concluded that the module-based discovery learning to the material buffer solution was already valid and practical, so that it can be used in learning activities in senior high school chemistry XI grade students.

C1 - 12 Analysis of Students Misconception of Atomic Structure in SMA Adabiah Padang

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Atomic structure is the basic concept in chemistry. Based on the examination result in X grade of SMA Adabiah Padang, most of student comprehended less than 60% of atomic matters. It will impact the student understanding when they are study at the higher grade because the concept of atom in X grade is the basic concept of atom and the develop concepts will learn in higher grade. Because of that, a study was held to know students misconception, so the teacher can design the proper teaching learning next. The type of this study is qualitative descriptive which explorative and cross sectional approach. The open ended questions were given to 204 students to know their conception about atomic structure. Based on analysis, the concept of atom by Dalton, Thompson and Rutherford stated by analogy and the misconceptions about Bohr atomic model, and also electron configuration of ion were found.
CHEMISTRY

(C2)
C2 - 01 Solubility of Methyl Red and Methylene Blue in Microemulsions and Lamellar Liquid Crystals of Water, Cationic Surfactant and Cyclohexane System

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Solubility of methyl yellow and methylene blue in microemulsions and liquid crystals of water, cationic surfactant and cyclohexane system, have been investigated. In fact, generally, solubility of methyl red and methylene blue in microemulsions and the lamellar liquid crystal (LLC), were strongly related to the chemical composition, nature and characteristics of dyes, microemulsions, and the lamellar liquid crystals.

C2 - 02 Biosensor as Food, Environmental and Medical Control

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Biosensors commonly comprise a biological (enzyme, DNA, Bacteria, cell, etc) recognition molecule immobilized onto the surface of a signal transducer to give a solid state analytical device. The reaction between the biorecognition molecule and the analyte is a heterogeneous and specifications reaction. Therefore the design of bio sensing interface is most important in determining the final performance of the biosensor. Advantages of biosensor as controlling food, environmental and medical are one of the small detection devices for toxic chemistry detection. Besides, the biosensor can detect in low level concentration (fM), in-situ and easily to use. A biosensor design that use urease enzyme could detect urea in urine for kidney control, alcohol oxidase enzyme for formalin detection in food and environmental, glucose oxidase enzyme for glucose control, while DNA for detection food from gen modified (GM).

C2 - 03 Trace Metals Accumulation in Vegetables from Some Areas in West Sumatera

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The vegetables are important source of essential trace elements for the people and constituted the lowest cost of main food for majorityof people in developing countries. Especially, the content of Cu and Zn in vegetables is important for human nutrition. Cu and Zn were determined in five selected sites from four locations for each of vegetables in west sumatera. These vegetables are cabbage, carrot, cauliflower and potatoes. The Cu concentration varied from 0.2729 – 0.4141 mg/L and the Zn Concentration are 0.5181 – 1.6509 mg/L. The obtained Cu and Zn contents showed that vegetables from this part of globe could serve as good dietary sources for essential trace metals and the levels are within safety baseline content for human consumption in the province.

C2 - 04 Biosorption of Cd (II) ION From Aqueous Solution by Lengkeng (Euphoria logan lour) Shell and Seed

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The ability of lengkeng(Euphoria logan lour)shell and seed a natural biosorbent, to remove Cd (II)
ions from aqueous solution by biosorption was investigated. The experiments were carried out by column method. The influence of solution pH, initial concentrations, particle size, adsorbent dose and flow rate were evaluated. The optimum condition was at pH 5, Concentration 400 mg/l, 250 Å, 25 µm particle size, 0.5 gr biosorbent and 3 ml/min flow rate with adsorption capacity 3.75 mg/g for lengkeng shell and 3.29 mg/g for lengkeng seed. The result showed that lengkeng shell and seed were effective as a biosorbent for removing Cadmium ions from aqueous solution. It is a low cost material that shows potential to be applied in waste water technology for remediation of heavy metal contamination.

C2 - 05  Sodium – Diethylthiocarbamate as A Complex Agent for Preconcentration and Trace Analysis Of Cd(II) Based on Flow Injection Analysis (Fia)

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Preconcentration is the process of increasing an analyte’s concentration before it’s analysis without addition standard’s process. In this research, preconcentration based on flow injection analysis (FIA). FIA based on injection of a liquid sample into a moving unsegmented continuous stream of a suitable liquid. Preconcentration with XAD-16 minicolumn. Amberlite XAD-16 polimeric adsorbent issued to absorb hydrophobic molecules from polar solvent. Cadmium (II) can be complexed with Sodium Diethylthiocarbamate (DDTC) at pH 7 formed Cd(II)-DDTC complex. This research focused on retained-elution Cd(II)-DDTC complex using amberlit XAD-16, observed how the effect of eluent, pH, selective of methods, volume of eluent, retention capacity of amberlite XAD-16. Time saturated of minicolumn was 23.1 second with time stream 2mL/minutes. The research shows that retention capacity of amberlite XAD-16 is 0.003 mg Cd(II)-DDTC per g XAD-16. The precision for this method expressed as coefficient variation for concentration 50 ppb is 3.46 % and for concentration 100 ppb is 2.20 %. The sensitivity and limit of detection obtained was 0.40 ppb and 1.61 ppb, respectively. The linearity range can be attained between 10 ppb until 100 ppb with a correlation coefficient is 0.966. This method has a good accuracy according to % recovery > 90 %. EF point is 3.09, CE point is 0.18 minutes, and CI point is 7.5mL. The study of analytical performance showed this method can be used to analysis Cadmium (II) on a trace concentration in water sample.

C2 - 06  Assessment of Trace Pb (II) in Sludge from Batang Anai River’s Padang

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The concentration of trace Pb (II) in sludge samples from Batang Anai River’s Padang were investigated in this study. The samples collected from three location and each location consist of three point sampling. In this study, Pb(II) were determined in some sludge samples after development Al(OH)₃ coprecipitation procedure using flame atomic absorption spectrometry (FAAS). Trace amounts of Pb (II) were quantitatively coprecipitated with Al(OH)₃ at pH 6 and the coprecipitant could be easily dissolved with 1 mol dm⁻³ nitric acid. The proposed method was successfully applied to determination of lead in sludge samples.
C2 - 07 Active Sites Prediction and Binding Analysis E1-E2 Protein Human Papillomavirus with Biphenylsulfonacetic Acid

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Cervic cancer triggered by Human papillomavirus infection induce is the second cause to woman death in worldwide. In attempts to find drugs for cervical cancer, biphenylsulfonacetic acid inhibitor has received attention due to Its inhibition to the ATPase activity of HPV6. The aim of this work was to study the structure of E1-E2 protein from human papillomavirus with the aim to find its potential binding sites to be exploited not only for biphenylsulfonacetic acid derivates but also for other potential inhibitors. Swiss model was used for 3D structure prediction and PDB: 2V9P (E1 protein) and 2NNU (E2 protein) having 33% and 100% identity respectively was selected as a template. The ligand binding sites were predicted using online server meta pocket 2.0 and MOE 2009.10 was used for docking. E1-and E2 protein of HPV has three potential binding site that can interact with the inhibitors. Docking biphenylsulfonacetic acid with these binding sites shows that ligand interact with the protein through three hydrogen bonds lys 403, arg 410 and lys 550.

C2 - 08 Cloning of Gene Fragment and Enzyme Structure Modeling of Bacillus Subtilis Exolevanase Fragment

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Inulin degrading thermophilic and thermostolerant bacteria are potential sources of inulin degrading enzymes. Gene fragment had been isolated from Bacillus subtilis using polymerase chain reaction (PCR) method with the DPE.slF and DPE.eR primers. Gene fragment was cloned into pGEM-T vector with E. coli as host cells. Size of the gene fragment had been found 539 bp. The gene fragment encodes 179 amino acid residues of protein fragment. The amino acid residues sequence of protein fragment was more similar to levanase than exoinulinase. Conserved motif FSGS was found in the protein fragment. Therefore, the protein fragment were an exolevanase. The protein fragment had spesific hits GH32 β-fructosidase. It had three residues active site and five residues substrate binding. The active site on the protein fragment were D (1 - WLNDP-5), D (125-FRDPK-129) and E (177-WEC-179). Substrate binding on the protein fragment were ND (1-WLNDP-5), Q (18-FYQY-21), FS (60-FSGS-63) RD (125-FRDPK-129) and E (177-WEC-179).

C2 - 09 Isolation of Antibacterial Activities of The Endophytic Microbes from Asam Kandis (Garcinia dioica Blume)

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Endophytes are microbes which live inside plant tissue, without causing any harm to host plant. They produce a variety of secondary metabolites for various biotechnological applications.
Garcinia.diocia Blume is one of endogenous plants that its fruits are used as spice, candied fruit, and fish preservative. The fruit extract presents antioxidant and antimicrobial activities. The aim of this study was to isolate the antibacterial activities of endophytic microbes from roots, stems and leaves of G. diocia Blume. The endophytes isolated were assayed against 10 food spoilage and foodborne pathogenic bacteria with disc diffusion method. The number of endophytes from roots, stems, and leaves of G diocia Blume were 10, 14, and 21 colonies, respectively. A total of forty five endophytes were isolated, including 21 bacteria and 24 fungi colonies. Eighteen bacteria colonies revealed antibacterial activity against about 7-8 bacteria tested, 2 colonies (BND5, BNB1) against 9 bacteria tested, and only 1 colony (BND3) against 10 bacteria tested. The antibacterial activities of twenty four endophytic fungi were promising because most of them (83%) inhibited the growth of all bacteria tested, except for colonies of JPD1, JMB6, JNA2, dan JPD5. Their antibacterial activities were higher than endophytic bacteria, where the mean zones of inhibition were found to be 2.175-23.20 mm (fungi) and 0.295-2.728 mm (bacteria). The fungi isolated from G. diocia Blume were potential sources of antibacterial compounds and could be further develop for natural food preservative agents.

C2 - 10 Photoelectrosplitting Water Mechanism at Carbon Electrode Surface Using Indoor Lights

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This research aims to investigate process and mechanism of splitting water by illumination copper oxide using indoor lights. We report here an innovative approach, in which the lights are used from low energy and rarely never using in general photovoltaic system. The illumination is monitoring with high resolution CMOS Camera, 13 MPixel of OPPO X9006, to capture image of splitting water. Splitting of water to produce hydrogen due on the Carbon (Graphite) electrode surface with electricity current from Cu2O/Al PV Cell and Na2SO4 electrolyte. Tandem of PV cell and Electrolysis Cell (PV-EC) produce Hydrogen gas, in which electric current is 4.27 Voltage and 0.920 mA in Na2SO4 0.5 N optimal condition. PV Cell use Cu2O/Al as electrode with surface area 0.003711 m2. With eleven PV cell series arrangement (surface area = 0.018555m2), produce voltage 4.27V (this voltage was exceed minimum voltage for water splitting with voltage 4.27V) and current 0.910 mA. The process of water splitting observed at initiation of formation H2 gas and H2 release at carbon surface. After 1 hour and 50 minutes, H2 gas volume produced reach 0.00281 mL.

C2 - 11 Evaluation of the Public Gold Mine Through the Elements Analysis by using Instruments Xrd and Xrf In Bukit 12 Mandailing Natal North Sumatra

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The region of Mandailing Natal (Madina) in North Sumatra is one of areas in Sumatra, which has sizable mineral reserves, and it has been already proved that there was a lot of exploration in that area. The region of Bukit 12 is part of the Madina area which also has the potential of rocks containing minerals and a public-scale mining areas. At first, the rocks in this mining area public suspected by the people that it contained gold and copper. Therefore the researcher conducted the research which aimed to analyze the elements contained in this rock. This research was experimental research with was conducted in the laboratory experiments of materials research
Department of Physics and Chemistry Department in UNP. To view and identify the concentration of the chemical element used method of *X-Ray Fluorescence (XRF)*, whereas to determine the crystal structure of rocks used method of *X-Ray Diffraction (XRD)*. Based on the results of measurements using the method XRF showed that the rock quarry public composed by 62.176% Si, 21.997% Al, 6.81% C, 4.193% Fe, 2.884% Cu, while the oxide form 66.66% SiO$_2$, 25.240% Al$_2$O$_3$, K$_2$O 3.292%, 2.201% Fe$_2$O$_3$ and 1.257 % CuO. While the results of measurements obtained using XRD method that rock public scale mining produces the highest peak indicated by 75% SiO$_2$, Gold (Au) 21% and copper (Cu) 4%. From the above data it can be concluded that turns rock public scale mining in Bukit 12 contained dominant silicon oxide (SiO$_2$) and slightly contained aurum (Au).

**C2 - 12 Synthesis and Characterization of ZNO Nanoparticles By Sol-Gel Method with Various Additives**

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Preparation of zinc oxide (ZnO) nanoparticle with various additives by sol-gel process has been studied. ZnO nanoparticles were obtained by using zinc sulfate heptahydrate as the precursor, ethanol as the solvent. Ethylene glycol and urea were used as the additives by the addition of potassium hydroxide solution to adjust the pH value. The powders were formed by drying in the temperature of 105 $^\circ$C for 60 minutes and after heating at 500 $^\circ$C for ± 1 hour. The products were obtained in white powders. The synthesized ZnO were characterized by X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM). The XRD patterns showed ZnO forms were produced generally in hexagonal structure (*wurtzite*). Crystallite sizes of ZnO were estimated by using Scherrer equation. The particle size of ZnO prepared by using ethylene glycol and urea obtained in the range 18-70 nm and 26-75 nm respectively. SEM micrograph of ZnO shows agglomeration of hexagonal nanoparticles and the the distribution size is 0.1-1.0 $\mu$m approximately.

**C2 - 13 Isolation and Characterization of Flavonoid from Gambier Plant Leaves (*Uncaria Gambir* R.)**

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Gambier plant leaves (Uncaria gambir R.) is a medicinal plant of the Rubiaceae family which distributed in many area in Indonesia such as West Sumatera. This aim of this research is to isolate a flavonoid compound from gambier plant leaves (Uncaria ganbir) and its characterization. The isolation and characterization of flavonoid from ethyl acetate fraction of Uncaria gambir R has been done. Sample was extracted by maceration, and purified with column chromatography, and characterized with spectroscopic methods. The flavonoid isolate is brownish yellow powder which decomposed at 177.7-178.8 $^\circ$C. Based on ultraviolet and infrared spectra analysis, it is predicted as dihydroflavonol with hydroxyl groups at C$_6$ dan C$_7$. 
C2 - 14  An Efficient Method for the Synthesis of Sodium Silicate from the Silica Sand as Commercial Chemicals for Various Industrial Materials

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An efficient method for synthesis of sodium silicate from silica sand was done in one step, by calcinations of the slurry of silica sand, NaOH, Na\(_2\)CO\(_3\) and water at temperature 275 °C for 1 h. Compared with fusion method with Na\(_2\)CO\(_3\) at high temperature 1000 °C, or hydrothermal method with concentrated NaOH at low temperature 300 °C, but at high pressure and damage the crucible. In this study the mixture of sodium carbonate (Na\(_2\)CO\(_3\)) significantly reduces fusion temperature of silica. The sodium silicate products were characterized with X-ray fluorescence. The result show that, the best sodium silicate in white solid form, mol ratio SiO\(_2\)/Na\(_2\)O 0,58 in mol-ratio range of sodium silicate commercial, high solubility 100%, containing Fe below the minimum threshold of commercial sodium silicate (600 ppm), as many as 16.5 ppm.

C2 - 15  Synthesis of Copper Oxide Thin Film Via Sol-Gel Dip-Coating Route For Spectrally Selective Absorber Material

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Copper oxide thin film coatings have been successfully coated on reflective aluminium substrates via facile sol-gel dip-coating route for spectrally selective absorber (SSA) application. For quantitatively analysis, the reflectance spectra obtained from UV-Vis-NIR and FTIR equiped with the integration spheres were used to measure the absorptance and emitance values, respectively. To optimize the performance, relevant parameters such as the concentration of sol precursor and the dip-drying cycle were investigated. The increase of the concentration of copper sol precursor in range of 0.1 - 0.3 M increased the absorptance value, likewise with the increase of the dip-drying cycles. The maximum absorptance of \(\AA^-\ \AA^-\) \(\AA^-\ \AA^-\) =72% with a spectrally selective absorber profile was achieved by a SSA material synthesized using 0.3 M copper nitrate, 0.3 M propionic acid, and 8 times dip-drying cycles. The emitance value of \(\AA^-\ \AA^-\) \(\AA^-\ \AA^-\) =6.63% for this coating was recorded. Good optical performance of spectrally selective absorber and the operational simplicity of the synthesis process make this coating have high prospect as spectrally selective absorber material.

C2 - 16  The Effect of Some Parameters Over the Titanium Tetrahedral Framework in the Synthesis of AlkylSilica-Titania

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Some parameters such as the addition of hydrolyzing agent (water), ratio of Si/Ti, solvent (toluene) and homogenization methods (sonication and stirring) have been investigated in order to produce silica-titania composites with titanium tetrahedral coordination. Those parameters were applied in the reaction between octadecyltrichorosilane (OTS, silica precursor) and tetraethyl orthotitanate (TEOT, titania precursor) at room temperature. The synthesized products were characterized by DR UV-Vis and then calculated by spectra deconvolution using Gaussian equation. The result showed that the addition of water and solvent were increased the fraction of titanium tetrahedral
framework. Based on the ratio of Si/Ti, the number of titanium tetrahedral decreased by increasing the number of Ti-loading. In addition, the homogenized sample using an ultrasonic showed the higher titanium tetrahedral framework than that of stirring.
BIOLOGY
EDUCATION
(B1)
B1 - 01  Use of Mind Map In Increasing Student Learning Activities and Results of General Biology Course in Fmipa Unp Padang

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One of the activities that can improve learning outcomes and student learning activity is the use of learning strategies. Research aims to determine the use of mind map to improve the activity and student learning outcomes in general biology courses at the Faculty Mathematic and Science UNP Padang. Research method used is descriptive method. The population is of Chemical Education students who take courses in General Biology half of July to December 2014. The sample is the entire population (saturated sample), amounting to 49 people. The Data collected in this study is the ability of the students create a mind map, quizzes, observation and interviews. Data processed descriptive. The results Showed that the mind map can be used for the evaluation of learning that can Enhance the activity and student learning outcomes. In addition, students responsibility strategies well as applied learning with a mind map

B1 - 02  Developing Authentic Assessment for Contextual Teaching and Learning Model at Animal Taxonomy Course

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Recent studies have shown that Contextual Teaching and Learning (CTL) is one of the effective way to improve students’ learning achievement. Therefore, Animal Taxonomy Course in Biology Department, Faculty of Mathematics and Science, State University of Padang has done using CTL Model, but the appropriate assessment for this learning model does not available yet. The purpose of this research was to create an authentic assessment for CTL model at animal taxonomy course in Biology Department, Faculty of Mathematics and Science, State University of Padang. This assessment developed using four-D models, which consist of 4 steps: define, design, develop, and disseminate. The subject was validated by 5 experts on animal taxonomy and assessment, 15 biology students that have taken the animal taxonomy course in 2014 for practicality test, and 33 biology students that have been taking animal taxonomy in 2015. The data collected qualitatively using percentage formula.

B1 - 03  Analyzing of Natural Science Teacher Understanding at Padang City about Science Literacy, Problem Solving and Scientific Approach

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The result of TIMSS and PISA explained that science literacy of Indonesian student is low. One of the factors is influenced by the teacher. Science literacy must have with students as a skill to prepare the attract the future challenges. The skill could be increase by learning process with problem solving approaches and scientific approach. Teacher has a main role in learning process, that is why teacher should understand about science literacy, problem solving and scientific approach in order to improves the skill of student. This research has a goal to know about understanding of teacher with science literacy, problem solving and scientific approach. This is a descriptive research. Population and sample is a teacher who had joined in Curriculum 2013 coaching at 22-26 June 2014. Sampling techniques is total sampling. Data was collected by using a questionnaire which conclude of 40 items. Thus data would analyze by count the percentage.
Result of this research told that an average percentage of Science Teacher of Junior High School (SMP) in Padang about understanding literacy (60%). Understanding about connection between problem solving (62%) and understanding about scientific approach is 75%. Understanding about connection between problem solving and science literacy (77%), connection between problem solving and scientific approach (58%) and connection between science literacy, problem solving and scientific approach (85%).

B1 - 04  The Effect of Giving Homework by Making Mind Map Before Cooperative Learning Thinking Aloud Pair Problem Solving on Students Biology Learning Competency at SMAN 1 Sungai Aur

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This research was conducted based on the problem that had been found at SMAN 1 Sungai Aur, where the learning method that applied by the teachers are still dominated by lecturing and unstructured discussion which give impact on competency of biology learning of the student. Therefore, authors apply giving homework by making mind map before cooperative learning Thinking Aloud Pair Problem Solving. The aim of this research is to determine the effect of giving homework by making mind map before cooperative learning Thinking Aloud Pair Problem Solving on student biology learning competency at XI grade of SMAN 1 Sungai Aur. This is an experiment research, using “the Static Group Comparison Design”. The Population of this research were all student in XI grade of SMAN 1 Sungai Aur. Sample was taken by using saturation technique, which class X1_2 is assigned as experiment class and X1_1 as control class. Data was analyzed using t-test. The conclusion of this research is that giving homework by making mind map before cooperative learning Thinking Aloud Pair Problem Solving giving positive effect to student biology learning competency at class XI in SMAN 1 Sungai Aur.

B1 - 05  Modern Instructional Design on Educational Research : How to Use the Adaptive Systems on Instructional Of Biology

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The research objective is to obtain a productin the form of instructional biology education research methodology using the principles of adaptive instructional system that is valid and practical. This research uses design Plomp, has four stages preliminary research, prototyping stage, the assessment stage and systematic reflection and documentation. The primary data were obtained from validation and observation sheets and interview guide. The secondary data were obtained from the academic unit. The qualitative data were analyzed with a step reduction, data presentation and conclusion. The quantitative data were analyzed with descriptive statistics. The results of preliminary research found any problem on learning, are (a) the learning processis not characterized by a national qualifications framework of Indonesia, and it’s not in accordance with the vision of the institution and the characteristics of student. The results of prototyping stage is valid with the construction ofa prototype rated load 9 main competencies, 14 supporting competency and supported by 8 concepts. The results of the assessment stage is a practical prototype on cognitive aspects, less practical on aspects of skills and attitudes. The use of adaptive instructional learning system is one way in finding a solution to the problem of student learning. Thus concluded that it had acquired modern instructional based adaptive instructional valid and practical. The resistance to the revision of the
products that have been produced needs to be done by aligning syntax with the actual, use an external expert review, and the practicalities of a broadertest.

B1 - 06  Learning Style of First-Year Biology College Students in State University of Padang

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At the beginning of the learning process in college, one of the things that must be understood by a lecturer is identifying student’s learning styles. Basic knowledge is needed about condition of the student in order to achieve instructional goals. By knowing the learning styles of students, lecturers can design techniques and methods to make an effective lecture time, to open the opportunity to make learning productivemore, as well as to design appropriate approach for each activity. For students, this research will be useful to know whether learning method that they use is accordance with their learning styles, also to open some opportunities to change their learning habits, it can also be a reference for what types of careers corresponding roughly to live. By understanding the importance of basic knowledge about the learning styles, researcher have described the learning styles of freshmen year in Department of Biology, Faculty of Mathematics and Natural Sciences, State University of Padang. Of the 177 students who became the object of research, note 96 (54.23%) of them are visual learners. 58 (32.76%) of them are students who have audio style. The rest numbering 23 people (12.99%) have a kinesthetic learning style. These results provide information to faculty and students to use variety methods and media during the lecture time.

B1 - 07  Deepening matter and training for competence professional and pedagogic teachers of Mathematics and Science at Junior and Senior High School in District Dharmasraya of West Sumatra-Indonesia

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The teachers are one of key factor in students success acquire to get of science. Teachers have responsibility of professional education and teaching. The teachers are professionals in charge of planning and implementing the learning process, guidance perform, training and assessment. Is a professional teacher educators should have pedagogic, personality, social, and professional competence. The research aims to determine the initial value of professional and pedagogical competence of teachers junior and senior high school in the District Dharmasraya, West Sumatra-Indonesia. The study was conducted in September 2014, methodology with a competency test against 99 teachers. Mathematics as many as 33 teachers from 25 junior high school, physics and biology science 34 teachers from 24 junior high school and 32 mathematics teachers from 15 senior high school. To teachers conducted is pre-test, deepening matter and training, and post-test as research data. Quantitative analysis using Excel program. The results showed the average value of the pre-test of teachers of Mathematics SMP low at 45.45, however, increased by 25.55 points up 56%, the final value of 55.04. The pre-test pedagogical competence junior high science teachers are low at 48.28, an increase of 24.91 points up 51%. The final value IPA SMP teachers average of 52.79, post-test was 69.74 points up 32%. The average value of math teacher SMA/SMK is low at 45.94 increasing the value of pedagogical competence as high as 80.47, up by 75%. The final value of the average pre-test of 49.22.
BIOLOGY
(B2)
B2 - 01  Fish Farming Of Nila To Against The Population Reliance Of Biological resources At Kerinci Seblat National Park (Tnks) In Nagari Limau Gadang Lumpo, Pesisir Selatan

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Geographically, Nagari Limau Gadang is located adjacent to the Kerinci Seblat National Park (TNKS). The distance of Nagari Limau Gadang with TNKS area is about 2 Km. Nagari Limau Gadang consists about 2,500 people of 500 families (KK). About 250 families have lands cultivated at TNKS. The activity of fields manufacture was cut and burned the forest. The Logging and burning activities caused many species of flora and fauna were threatened with extinction. Economic activity of population is pressing The TNKS region very high, because TNKS forest is the place where they earn for living. The economic activity of Nagari Limau Gadang population can be survive without explored the TNKS if we are able to create other economic business options, such as Nila fish farming. Economically, Nila fish farming is very profitable, then the use of artificial feed itself can be carried out for the cultivation of Nila. Nila fish farming could be a model of economic activity option for reducing dependenced of Nagari Limau Gadang population on TNKS biological resources. The purpose of this study is that people no longer make a living in the forest of TNKS. Specific targets to be achieved from this study is for rising standard of living for Nagari Limau Gadang population and releasing the TNKS forest from the pressure of population and minimalizing the natural disasters at Nagari Limau Gadang. To achieve the goal, we need the action research. The population sample is who earn a living at the TNKS forest been as many as 40 families, then divided into 5 groups. In the first conducted research activities are counsel and guide the population sample on: (1) the benefits of the ecosystem and human, then the risk of make a living in TNKS; (2) create a pond breeding and rearing of Nila fish; (3) the breeding and mendered the Nila fish; (4) Making the fish feed; (5) collecting data of economic activity conducted population sample. Data taken from sample’s frequency of visits to TNKS. The economic activity data in the first year of the study were compared with data on a sample of economic activity in the second study. The second year of study lasts about 6 months. To see the similarities or differences between the mean results of economic activity used formula T-Test statistics. Activity is expected in the second sample is not more economic activity in the region TNKS. Of aquaculture for 6 months produced: (1) fingerlings 25,000, (2) an enlargement and nursery 5 units, (4) feed. The mean percentage of traffic TNKS sample members for 6 months to 86%. The visit to TNKS still high, it could not be concluded because the second phase of the research has not been carried out. Based on the research in second year, the group visitation level to TNKS is 75,06% in a month. The average of frequency reduction to TNKS is about 11.06%. The reduction of visiting to TNKS in second year of cultivating Nilotica can fight out the public dependence to TNKS.

B2 - 02  Growth And Tomato Nutrien Content With Chick Weed (ageratum conyzoides l.) Bokashi Applied

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Chick weed (A.conyzoides) is one of the most common weeds in dry land. Weeds can reduce the results of a variety of crops. On the contrary, the use of this weed as the organic material would be able to increase the nutrient content of the soil. The problem is the decomposition of this weed is naturally longer than the process in the form of Bokashi. This study aims to determine the effect of Chick weed applied in the form of Bokashi on growth and nutrient content of tomato plants. This
study was an experimental study and completely randomized design was used with 5 treatments and 3 replications. The treatment was rate of Chick weed bokashi those 100, 120, 140, 160 g/polybag and 0,6g NPK/polybag as a control. The research was conducted from September to December 2012 in the Screen House of Biology Department, Faculty of Mathematic and Sciences, Padang State University. Tomato growth observed was high, wet weight, biomass and weight of the fruit. While the nutritional quality of tomatoes were vitamin C and A. Data were analyzed using ANOVA and a further test DNMRT at 5% level. The results showed that Chick weed bokashi 120g/polybag give the best effect to the weight of tomatoes. However, Chick weed bokashi do not give effect to the high, wet weight, biomass, vitamin C and vitamin A of tomato significantly.

B2 - 03 Screening Optimization For Polysaccharide Deacetylase Producer Bacteria Isolated From Shrimp Ponds In East Borneo

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Polysaccharide deacetylase (PDA) is the member of CE-4 enzyme family which capable in conversion of a long chain polymer of chitin into chitosan, a prospective material which used in widely application. Here, in our work, the optimization the methodology in finding of new bacteria candidate which ability to produce chitosan from the waste of chitin that dispose in huge number in Indonesia after the shrimp processed for food. In our attempt, the use of an azo dye Congo Red is prospective as candidate to use in PDA producer screening. Experimental work base on minimal medium which use two tipe solution i.e. aquadest minimal based medium contained 0.5% of chitin (CAMM), and swamp water minimal based based with equal number of chitin to the latter medium (CSMM),. The results found that from the two media, in CSMM medium grown 295 colonies, 217 colonies suggested produces PDA and 78 colonies produces Chitinase. On the other hand, in CAMM medium grown 311 colonies, 221 colonies suggested produces PDA and 90 colonies produces Chitinase, respectively. The method, can discriminate the PDA producer and chitinase producer.

B2 - 04 Pollen Morphometry Of Euphorbia Milii Moulins Some Varietas

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Pollen can be used to identify plant because of its unique structure and ornamentation. In addition, certain plants have specific pollen morphology. This research is aimed to find out the similarities and dissimilarities of pollen morphology structures in some E. miliit varieties. This is a descriptive research that was done at Botanical Laboratory of Biology Department, Faculty of Mathematics and Sciences, Universitas Negeri Padang. This research was started in December 2014 until January 2015. This research was done by using acetolysis method. The staining process of this method used saframin 0,1% in alcohol 70%. The samples of this research are the pollen of eight E. miliit varieties that were taken at some places in Padang City. Based on the result of pollen morphology observation, the pollen has isopolar polarity, radially symmetric, and has been released as monads. The size range of pollen is about medium (33,25µm) to large (50,48 µm). The pollen of
eight E. milii varieties has five shapes; suboblate, oblate spheroidal, prolate spheroidal, subprolate, and prolate. The pollen’s aperture is tricolporate type and the ornamentation shape is in reticulate. The dissimilarities of the eight E. milii varieties pollen morphology are in their shapes. Those five shapes are generally grouped into two; suboblate and prolate. Thus, it can be concluded that the structure of pollen morphology from those eight varieties are similar except the pollen’s shape that is influenced by the length of polar axis and equatorial sector.

**B2 - 05 The Effect Of Uncaria Gambier Roxb Extract On Levels Of F2-Isoprostanes In The Submaximal Exercise**

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Athletes always do strenuous physical exercises to prepare themselves to face a championship or a match in a short time. The exercise that fatiguing will increase the formation free radicals that can be damaged the cell membrane with peroxidation process lipid, so F2-isoprostane will formed. This process can be prevented by giving antioxidant from *Uncaria gambier Roxb* extract that containning highly level of catechins. This study is aimed to determine the effect of *Uncaria gambier Roxb* extract on levels of F2-isoprostane from Education Center and Sport Training Student in West Sumatera, who perform submaximal exercises. This study was experimented as pre-test and post-test group design to 17 students of football in PPLP West Sumatera. *Uncaria gambier Roxb* extract 500 mg are given 2 hour before submaximal exercises. The method to examine the F2-isoprostanes is ELISA. Statical analysis was *paired samples t-test* and the results obtained statistically significant when p <0.05. There is different effect of F2-isoprostanes levels before and after the administration of *Uncaria gambier Roxb* extract was 48,8 ± 16,9 pg/ml vs 35,3 ± 15,1 pg/ml, p<0.001. Giving *Uncaria gambier Roxb* extract may affecting the levels of F2-isoprostanes who perform submaximal exercise with a significant.

**B2 - 06 Management Analysis on Plants Morphology Lab Work in Basic Biology Laboratory of Stain Batusangkar**

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The main problem of this research focuses on how to manage a lab work activities of Plant Morphology in Basic Biology Laboratory of STAIN Batusangkar with the planning, actuating, and controlling stage. The purposes of the study are to describe, to analyze, and to conclude and to give recommendations based on the phenomenon in the focus of research. The method is descriptive with mixed methods designs and explanatory sequential design types, a quantitative data were collected and analyzed, followed by collecting and analyzing qualitative data and then interpret it. A quantitative data obtained through filling the questionnaire by the students and Plant Morphology lab assistant while qualitative data through interviews with lecturer, lab assistants, students, and lab work assistant. The results of data analysis, showed that the stages of planning, actuating, and controlling of Plant Morphology lab work relatively effective with ratings of 80, 76.2, and 78.1. Thus, the management of Plant Morphology lab work in Basic Biology Laboratory STAIN Batusangkar belong to effective criteria (78.1).
B2 - 07  Isolation and Characterization Thermophilic Bacteria which Produce Xylanase From Mudiak Sapan Hot Spring, South Solok

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Enzyme xylanase have a highest prospect from the other enzyme. The production of enzyme xylanase have very important in the global industry, especially pulps industry, foods, drinks, and xylosa production. The most important function of this enzyme in industry is as a biocatalisator. The major potential application of xylanases involves the pulp and paper industry, as hydrolysis of xylan facilitates the release of lignin from paper pulp and reduces these of chlorine as a bleaching agent. Generally, xylanase is produced by thermophilic bacteria that have thermostable characteristic. Thermophilic bacteria which produce xylanase can be obtained from Mudiak Sapan hot spring, South Solok Regency. The temperature of Mudiak Sapan hot spring reach 93°C with pH 8. The aim of this research is to isolate thermophilic bacteria and to know characteristic of thermophilic bacteria isolates include enzyme xylanase activity. This research is descriptive. This research has been done at Microbiology Laboratory Biology Departement FMIPA UNP. Step of research procedure is preparations, realizations, and observations. Based on observations is produced 19 isolates thermophilic bacteria, from 19 isolates 13 isolates showed the production of enzyme xylanase with highest xylanolitic index 1,39 mm from MS 18 isolates. The Mudiak Sapan hot spring South Solok Regency is produced 19 thermophilic bacteria, 13 isolates produce enzyme xylanase.


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Research about food changes of mungkuih fish (Sicyopterus macrostetholepis Blkr.) based on body size and time along as Batang Kuranji river had been done on July to October 2011. The aim of study to know composition of food course in nature and changes in the stomach of fish food to body size and time. The research was conducted by survey method and sampling snippets as much as 4 point along the Batang Kuranji river. The fish sample collected by tangguk nets. Perifiton and benthic sample collected by quadrat method. The result show that dominant diet in nature period from July to October 2011 were Cymbella turgidula, Fragillaria capucina, Fragillaria pinnata, Nitzschia clausii, Nitzschia sigma, Synedra rumphens, Cladophora glomerata, decoratum Cosmarium and Oedogonium microgonium. Changes in body size did not change the food in the stomach of fish S. macrostetholepis. The time change was to change the food in the stomach of fish In July-August 2011 was dominated by Bacillariophyceae and September-October 2011 was dominated by Chlorophyceae and Cyanophyceae.

B2 - 09  Detection of Calcite Bacteria from Hotspring Wawolesea Southeast Sulawesi

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Microbial mineral precipitation is resulted from metabolic activities of microorganisms. Bacteria are incredibly diverse and abundant and many bacterial species contribute to the precipitation of mineral carbonates in various natural environments. In the present investigation bacterial strains were isolated from concrete environment, isolates were characterised till species level and their activity. Steps of the conducted research were (1) the isolation and selection of bacteria; (2) the characterization and identification of selected isolates; (3) analysis of bacterial activity. In this study, 6 isolates have been successfully grown laboratory. One isolate, was able to grow on media Luria Bertani contains CaCl$_2$.2H$_2$O. The observation of morphological the bacteria, isolate showed is a group of Bacillus sp. The isolate could grow at pH 7-8, with optimum temperature 47°C. Test results showed the bacteria can induce precipitated calcium carbonate of 12 mg/mL.

**B2 - 10 Tetra Primer-Arms-Pcr Construction To Detect Snp Rs290487 Tcf7l2**

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A Gene which reported to be associated with the expression of diabetes mellitustype-2 is Transcription Factor 7 Like 2 (TCF7L2). TCF7L2 gene have many polymorphisms (SNP). One of TCF7L2 gene polymorphisms that mostly study to detect diabetes mellitus is SNP variant rs290487. The objective of the research is: Primer Construction to detect SNP variant rs290487 TCF7L2. The main steps of the research are: DNA isolation, design tetra primers for SNP rs290487 TCF7L2 with primer designer software, SNP variant rs290487 gene amplification with TCF7L2 Tetra Primer-ARMS-PCR method, direct DNA sequencing method and bioinformatics analysis. Based on the data analysis, can be concluded that four primer has successfully constructed, and they are FOPRS29, ROPRS29, FIPRS29 and RIPRS29. FOPRS29 and ROPRS29 are external primer which amplify the fragments of the gene TCF7L2 contain SNP rs290487 (the size band that formed is 443 bp), then FIPRS29 used to amplify allele C (PCR product size is 208 bp) and RIPRS29 primer used to amplify the T allele with the size of the product is 293 bp. That constructed primer can recognize SNP rs290487 TCF7L2 when using Tetra Primer-ARMS-PCR Method.

**B2 - 11 Floristic Diversity, Abundance and Association of Tree Plant in Bukit 12 National Park Jambi**

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Plant is an important ecosystem component that capitalize to the present of nutrient. Association between plant especialtly tree has an dominant impact to the nutrient suplay. Bukit 12 National Park is one of ecosystem that has many change in land use and still rarely in research. The paper aim to study the diversity, abundance, and association of tree plant in Bukit 12 National Park, Jambi. We found that Euphorbiaceae were the most species diverse for three site. Ochanostachys amebentacea Mast (Oleaceae) become the dominant species in the site that has more flat area, whereas the other site that more sloping there are no dominant species. Positive association occured in all site, whereas negative association occurred only on flating site. We conclude that, the slope of the area will impact to diversity, abundance, and association of plant in teresterial ecosystem.
TECHNOLOGY
AND OTHER
(TO)
TO - 01 1-Phase Inverter Trigger Pulse Control Design Based Arduino Microcontroller In The Hybrid Power Plant Regulator Systems

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This paper suggests the development of a trigger pulse control of single-phase inverter systems to equip a renewable power plant system. Inverter capacity is intended for household, it is easy to be realized or the boarding house procurement cost is affordable and easy to obtain its components in the local market. Ease and grace in the realization meant that the public interest to use them, so that in turn they understand and get used to using a system of this renewable source of electrical energy. Although the results of the design development of the inverter is expected to easily be operated and cheap, but do not ignore the factor of safety, security and health (K-3). These pulses trigger system using the Arduino microcontroller. To the microcontroller was loaded control program which will set the pulses trigger on the transistors power inverter. The control program is set such that it will produce a sine form output that is closer to a pure sine wave. This research was conducted using the circuit design, simulation using Proteus ISIS-7, prototype buildings and characteristics testing of the device. At the end of this study will produce a model system prototype trigger pulse control inverter 1 phase with sine form output is closer to pure sine. This trigger pulse control program using a pulse width modulation (PWM) program and combined with PID so that in addition to the pure more form of sine output and can also tackle voltage output fluctuations due to load changes.

TO - 02 A Gis-Based Website Of Hand Craft In Bogor

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A Geographic Information System (GIS) is an information system that is designed to work on referential data in a spatial or geographic coordinates. The Geographic Information Systems of Handicrafts in Bogor is designed into several stages; they are the stage of analysis and requirements definition, the system and software design, the implementation and unit testing, the integration and system testing, and the operation and maintenance.

The purpose of this study is to create a geographic information system of handicraft in order to preserve one of Indonesian's culture namely handicrafts, especially in Bogor area, by providing a website that is accessible to the public that shows the location, product, and other information easily, quickly and accurately by using internet connection.

This application is designed by using some software namely ArcMap as a framework, HTML, and CSS as a programming language. This study will produce a website that provides information about the geographic location of Bogor, the handicraft products, maps, and other supporting information.
TO - 03  The Technique of Variable Projection and Rules of Temple Area in Operation of Series

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Learn and discuss the operation of series, we recognize about the operation series Gauss. In the operation series Gauss, Gauss theory cannot explain the change in his tribe series is not constant, Operations on power series and doing multiplication and division operations in a series. One way to complement the Gauss theory about it is to use rule temple area and using a variable projection techniques. The purpose of this study is to provide a description and prove that the technique is rules of temple area and techniques projections about the operating variable rank series and the series operations is not constant so as to complete the theory of Gauss series. This research method uses literature study. The result of this study is that the area temple rules technique and variables projection can describe and explain the series operations formulation especially operations and the operating series constant and operations on power series that his tribe not yet formulated the theory Gauss.

TO - 04  Model Rules Of Student Academic Achievement With The Algorithm C 4.5

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This research proposes a model rule of student academic data with achievement index in private colleges. The more dominant factors that affect the achievement index have yet to be surely known. The data were obtained obtained from academic database. In this study, the algorithm C 4.5 decision tree is applied in order to obtain a model rule that shows average scores of competence-based curriculum courses. The study shows the quality of academic achievement based on scientific courses and skills.

TO - 05  Improving Students’ Activities And Learning Outcomes In Natural Science In Class V By Using Somatic Auditory Visual Intellectual (Savi) With Science Kit Seqip In Sd Negeri 25 Seroja Lintau

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This classroom action research was motivated by the students’ low activity and learning outcomes in natural science. One of the reasons is the lack of teachers’ ability in choosing appropriate learning approach and using of learning equipments in natural science learning process. Thus, the implementation of Somatic Auditory Visua Intellectual (SAVI) approach with science KIT SEQIP is one of the ways to solve this problem. The objective of this research is to improve the students’ activities and learning outcomes natural science class V SDN 25 Seroja Lintau by using SAVI approach with science KIT SEQIP. This Classroom Action Research was conducted in two cycles. Test was carried out at the end of the cycle. The subjects of this research were 27 fifth grade students in SDN 25 Seroja Lintau. The
instruments of this research were the observation sheets of students’ and teachers’ activities, and the sheets of students’ learning outcomes. The results showed that the percentage of students’ activities improvement from the first cycle to the second cycle for group-activity indicator from 66.5% into 79.5%, 63% for asking-and-answering-question indicator into 83%, 53.5% for observation indicator into 74%, and 50% for making-conclusion indicator into 72%. In addition, the students’ learning outcome in cycle I was 51.9% improved into 89% in the second cycle regarding its accomplishment percentage. It indicated that there was a significant improvement of students’ activities and learning outcomes in natural science class by using Somatic, Auditory, Visual, and Intellectual approach (SAVI) with science KIT SEQIP.

TO - 06 Study About Spatial Variation Parameters of Seismotectonics to Know the Conditions for Local Stress Tectonics And the Level of Earthquake Activeness in West Sumatra and Around it

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Seismotectonic spatial variation parameters and \( b \) value can describe the tectonic stress conditions and Seismic activity level in a region. \( a \) and \( b \) value is seismic activity level and seismotectonic characteristics in a region. A lower value reflects that the level of seismic activity is low and vice versa at high value of \( a \), whereas a low \( b \) value can describe the condition of local tectonic stress is high and vice versa at high value of \( b \). In this study, by using the catalog of BMKG and NEIC / USGS observation period on 1 January 1973 - 31 December 2010 with the boundary coordinates of 2 LU - 4 LS and 94 BT - 104 BT which covers an area of West Sumatra and surrounding areas. To determine the spatial variation of parameters by using software seismotectonic ZMAP (Wiener and Wyss, 2002). From the analysis reveals the spatial variation of \( b \)-value ranging from 0.6 - 2.0 and an \( a \) value ranges from 4 - 11 of local high stress conditions (low value of \( b \)) which observed around Mentawai Island, southern part of the island and along the mountain chain of West Sumatera and local low stress conditions (high value of \( b \)) which observed west - northwest section of the island and along the mountain chain of northern Sumatera. While the low level of seismic activity which occurs in Mentawai island and seismic activity on high level are going on in the west-northwest of the Nias Island and along the mountain chain of northern Sumatra

TO - 07 Design And Contructions of Simple Distilations Unit With Reflux Column Model for Cane Tibarau (saccarum spontaneus linn.) Bioethanol Productions

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Writing this article is to present the draft to build and develop a simple distillation unit with reflux column models. As well as part of the research objectives to produce bioethanol from the fermentation of the base material for the production of (biomass) in the form of plant cane tibarau (saccarum spontaneus Linn). The production of bioethanol in the context of the research-oriented development activities biofuels, which is referred to as gasohol consists of a mixture of bioethanol with premium. For this purpose, among others, we need a system that is trustworthy distillation equipment to obtain the quality bioethanol eligible. One system
equipment in question is the model of reflux column. Results can then be applied to the design industry efforts household scale, so that the industry can cultivate and develop bioethanol raw materials are in short supply in their environment such as sugar cane plants tibarau that have untapped potential.

**TO - 09 Geographical Information System Handycraft Application Based On Mobile In Depok City**

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Indonesia is famous for its art and culture. There are so many form of art. One of them is handycraft. There are all sort of handycraft. Every area has different kind of handycraft. Most of the times, the handycraft can be easily found. But sometimes there is also a handycraft area that isn't well-known. That is why the geographical information handycraft application based on mobile in Depok city is made. This application is made to make it easier for its user to find the information about the handycraft in Depok city. Geographical information handycraft application based on mobile in Depok city is made using Java and XML programming language for Android. The making of this application used Android Studio that is equipped with Android SDK (Software Development Kit).

**TO - 10 Integrated Farming, Creating Zero Waste Environment**

Lelya Hilda, Syafiruddin, Replita, 1Tarbiyah and Teacher Training Fakulty IAIN Padangsidimpuan, 2Agriculture Fakulty, UGN Padangsidimpuan

Integrated Farming System is the combination of all components of agriculture, which includes agriculture, livestock and fishery in an integrated farming system. The concept of integrated farming system will produce F4, which consists of the Food, Feed, Fuel and Fertilizer. Applying zero waste system means the waste from the farm is used as fertilizer to enrich the soil plantations, while plantation crops is used as animal feed ingredients. Specifically, some of animal manures are processed into compost and some into biogas which can be used every day as gas stove fuel.

**TO - 11 Geographic Information System Web-Based On Creative Industry In West Sumatra**

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Creative economic sector have a major impact on earnings, employment, value of exports, the welfare and sustainable development. Acceleration of the growth of information and communication technology to promote the creative industry is a major problem in the creative industry development plan. The aim of this research is to design a geographic
information system (GIS) web-based about the attributes of creative industries in West Sumatra. Linear Sequential Model / Waterfall Model is used in system development. This model consists of the stages of requirements definition, system and software design, implementation and unit testing, integration and system testing, operation and maintenance.

**TO - 12 Analysis of Spatial Impact of Domestic Waste Disposal of Ground Water Quality in The Lowu-Lowu Village, Baubau City**

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This study aims to determine the quality of their level of ground water due to the disposal of domestic waste that occurs in Sub-Lowu-Lowu, Baubau, Southeast Sulawesi. These results indicate that based on laboratory analysis of five wells sampled in this study is from 28 parameters in carefully there are 3 parameters (E. coli, Coliform, and Fecal Coliform), has exceeded the first-class quality standards in accordance with Southeast Sulawesi Provincial Regulation Number 7 of 2005 Concerning Determination of Environmental Quality Standards Southeast Sulawesi Province October 31, 2005. While based on the observation of Lowu-Lowu village of Baubau, the pattern of population distribution is uneven and large enough of volumes of the migrant especially in the holy month of Ramadan in accordance with the sampling research in which a resident immigrants homecoming. This resulted in more settlements less developed well planned so that it can result in the household waste disposal system such as sewage shower/ WC are not well organized. It can cause a decrease in the quality of ground water. Results of this study can be concluded that the majority of water wells have been contaminated by E. coli, Coliform, and Fecal Coliform, so that the water should not be consumed directly into drinking water.

**TO - 13 A Quality of Images Fusion For Remote Sensing Applications**

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Image fusion is a useful tool for integrating low spatial resolution multispectral (MS) images with a high spatial resolution panchromatic (PAN) image, thus producing a high resolution multispectral image for better understanding of the observed earth surface. With the development of new imaging sensor, image fusion has become an important issue for various remotes sensing (RS) problems such as land classification, change detection, object identification, image segmentation, map updating, hazard monitoring, and visualization purposes. When applied to remote sensing images, a common problem associated with existing fusion methods has been the color distortion, or degradation in the spectral quality. This often results in the difficulty in the precise interpretation of the pan-sharpened images generated through the image fusion. Thus, the main proposed of this research is to evaluate the quality of fused images for object identification. We examine the effectiveness of the following techniques multi-resolution analysis (MRA) and component substitution (CS) fusion. In order to improve this situation, the second purpose of this work is to establish an automatic and reliable way for the evaluation of the fused images, on the basis of both
qualitative and quantitative metrics. We have carried out fusion experiments for images obtained from typical high resolution satellite images. In this result, It is found that the component substitution (CS) fusion method provides better performance than the multi-resolution analysis (MRA) scheme. Quantitative analysis shows that the CS-based method gives a better result in terms of spatial quality (sharpness), whereas the MRA-based method yields better spectral quality, i.e., better color fidelity to the original MS images.

**TO - 14 Harmonic Filter Development For Saving To Building Electricity**

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This paper presents a simulation of a simple control scheme for a three-phase shunt pasif filter to remove harmonics and saving energy compensation of the non-linear loads. Non-linear loads is of, Computers, Printers, Air Conditioning (AC), Rectifier, energy saving lamps, motor control, etc. in modern buildings that cause harmonics. If the voltage and current harmonics injected into wire electrical installation of the building, there will be a Total Harmonic Distortion (THD). Voltage and current harmonics appearing will be a serious problem if the amount exceeds the limits of the standards set by the standards (IEEE 519-1992) International Electrotechnical Commission (IEC). So from the results of studies using EDSA Shofware THDi obtained before using the filter of 9.03% and after use filters THDi 4.42%. And be saving electrical current of 41 Ampere, because before using the filter 277 Ampere and after using the filter to 236 Amperes. Means a saving of 14%.

**TO - 15 Analysis of Behavior Deflection Composite Particle Board Cane Baggage Using Adhesives Tapioca**

**Hendri Nurdin, Hasanuddin, Irzal, Purwantono,** Prodi Teknik Mesin FT-UNP, E-mail: hens2tm@yahoo.com

Engineering materials such as composites are a blend of a variety of materials that can be made into a product. Particle board as composite an engineering material made from bagasse raw material after the extraction process. Innovation utilization of waste bagasse potentially be used as a composite particle board for furniture interior and furniture. Improved quality internal bonding particleboard made by looking at the effect of the adhesive. Deflection behavior which affects the ability to bending loads owned composite particle board that has broken resistance which can be measured as modulus broken. Ability broken modulus composite particle board as a quality parameter in its application as a furniture material. This method of manufacture of composite particle boards made by the process of emphasis and heated at 120 °C temperature. Models manufactured composite board with a variety of particle volume fraction ratio of bagasse 40%, 50%, and 60%. Binders used are starch adhesive. Bagasse as a filler particle board made of composite granules (mesh) measuring an average of 1.2 mm. Manufacture of composite board made with the same printing pressure that is equal to 100 kgf / cm2. The test method modulus of composite particle boards broken according to JIS A 5908 (2003) and SNI03-2015-2006. From these results obtained composite model of particle board on a mixture ratio of 60%: 40% have a fracture modulus (MoR) of 3.67 kg/cm². Where as another mixture ratio has a value lower than the mixture ratio of 60%: 40%. The use of tapioca starch adhesives can be applied as an adhesive in the manufacture of composite particle board with a range of lower production values. From this
condition can be stated that the ability of the composite particle board had a good deflection behavior as parameter endurance and strength. So the quality of the composite particle board bagasse can be applied as a furniture interior.

**TO - 16 Prediction of Currency Exchange Rate Using Hybridization of Exponential Smoothing and Backpropagation Neural Network**

**Imelda Saluza**

This study aims at finding out the use of hybridization of exponential smoothing and backpropagation neural network methods to improve prediction of financial timeseries data, so that the result could contribute useful information to investors in taking important decisions. In financial time series data design, linear and non linear models are often found simultaneously. Thus, using one model is not enough since it may cause another model does not appear. The combination of these two models or hybridization of linear and non linear models are needed to overcome the problem. This method is used to predict the exchange rate of Indonesian Rupiah (IDR) toward US Dollar and Saudi Arabian Riyal. The first thing in conducting this study was predicting the data using exponential smoothing method and continued by backpropagation neural network method. The result of the prediction were incorporated into a combined module in order to reach a result that could generate synergies as the final result. In conclusion, the result showed that hybridization method performs better than early method and this method could act as one alternative in predicting currency exchange.