PROCEEDINGS

4th International Conference on Technical and Vocational Education and Training (TVET)

Theme:
Technical and Vocational Education and Training for Sustainable Societies

Padang, November 9-11, 2017
at Hospitality Center
Universitas Negeri Padang

ISBN : 978-602-1178-21-8 (1)

Penerbitan & Percetakan
UNP PRESS

PROCEEDINGS

4th International Conference on Technical and Vocational Education and Training (TVET)

Theme: Technical and Vocational Education and Training for Sustainable Societies

General Chair:

- Prof. Ganefri, Ph.D. (Rector Universitas Negeri Padang)

Program Committee Chair:

- Dr. Fahmi Rizal, M.Pd., M.T. (Dean Fakultas Teknik Universitas Negeri Padang)

Steering Committee:

- Prof. Dr. Nizwardi Jalinus, M.Ed. (Universitas Negeri Padang, Indonesia)
- Prof. Dr. Ali Ghufron Mukti, M.Sc., Ph.D. (Direktorat Jenderal Sumber Daya Ilmu Pengetahuan Teknologi Pendidikan Tinggi Kementrian RISTEKDIKTI)
- Prof. Dr. David Stein, Ph.D. (OHIO State University, USA)
- Prof. Junji Kiyono (Tottori University, Japan)
- Prof. Maizam Alias, Ph.D. (UTHM, Malaysia)
- Prof. John Williamson, Ph.D. (University of Tasmania, Australia)
- Prof. Selamat Triono Ahmad, Ph.D. (Universitas Negeri Medan, Indonesia)
- Dr. Rijal Abdullah, M.T. (Universitas Negeri Padang, Indonesia)
- Drs. Hambali, M.Kes. (Universitas Negeri Padang, Indonesia)
- Drs. Hanesman, MM. (Universitas Negeri Padang, Indonesia)
- Dr. Ir. Arwizet K, ST., MT. (Universitas Negeri Padang, Indonesia)
- Drs. Martias, M.Pd. (Universitas Negeri Padang, Indonesia)
- Drs. Raimon Kopa, MT. (Universitas Negeri Padang, Indonesia)

Scientific Committee:

- Prof. Sai Vanappali (University of Ottawa, Canada)
- Prof. Junji Kiyono (Tottori Univerity, Japan)
- Prof Maizam Alias, Ph.D. (UTHM, Malaysia)
- Prof. Jailani Mhd. Junos, Ph.D. (UTHM, Malaysia)
- Prof. Dr. Nizwardi Jalinus, M.Ed. (Universitas Negeri Padang, Indonesia)
- Ir. Syahril, ST., MSCE., Ph.D. (Universitas Negeri Padang, Indonesia)
- Prof. Dr. Kasman Rukun, M.Pd. (Universitas Negeri Padang, Indonesia)
- Prof. Dr. Ing. I Made Londen B (Institut Teknologi Sepuluh November Surabaya)

Reviewer:

- Prof. Dr. Nizwardi Jalinus, M.Ed.(Universitas Negeri Padang, Indonesia)
- Dr. Hansi Effendi, ST. M.Kom.(Universitas Negeri Padang, Indonesia)

- Rusnardi Rahmat Putra, ST., MT., Ph.D. (Universitas Negeri Padang, Indonesia)
- Ir. Riki Mukhayar, ST. M.T. Ph.D. (Universitas Negeri Padang, Indonesia)
- Risfendra, S. Pd. MT., Ph.D. (Universitas Negeri Padang, Indonesia)
- Krismadinata, ST. MT. Ph.D. (Universitas Negeri Padang, Indonesia)
- Dr. Asrul Huda, S. Kom. M.Kom.(Universitas Negeri Padang, Indonesia)
- Dr. Remon Lapisa, MT. M.Sc. M.Eng. (Universitas Negeri Padang, Indonesia)
- Wawan Purwanto, S.Pd. M.T., Ph.D. (Universitas Negeri Padang, Indonesia)

Editor:

- Prof. Dr. Nizwardi Jalinus, M. Ed. (Universitas Negeri Padang, Indonesia)
- Prof. Dr.Kongkiti Phusavat (Kasetsart University, Thailand)
- Prof. Maizam Alias, Ph.D. (UTHM, Malaysia)
- Prof. Dr. Ramlee Bin Musthafa (Universiti Pendidikan Sultan Idris Malaysia)
- Prof. Dr. Michael Koh, Ph.D. (Republic Polithecnic Singapore)
- Krismadinata, ST., MT., Ph.D. (Universitas Negeri Padang, Indonesia)

Cover Design:

- Dr. Asrul Huda, S.Kom., M.Kom (Universitas Negeri Padang, Indonesia)

Layout:

- Dr. Remon Lapisa, MT., M.Sc. M.Eng (Universitas Negeri Padang, Indonesia)
- Rahmat Azis Nabawi, S.Pd., M.Pd.T.(Universitas Negeri Padang, Indonesia)
- Syaiful Islami, S.Pd., M.Pd.T.(Universitas Negeri Padang, Indonesia)

Cetakan :

- Kesatu, Agustus 2018

Publisher:
UNP PRESS
Jln. Prof. Dr. Hamka Air Tawar Padang
West Sumatra – Indonesia

Penerbitan & Percetakan
UNP PRESS

ISBN 978-602-1178-21-8 (1)

9 786021 178218

FOREWORD

Welcome for all respected scholars, researchers, post graduate studentsand especially Keynote Speakers to the 4 ICTVET. The theme of the conference focus on Technical and Vocational Education and Training for sustainable societies and consist of six subthemes. i.e Development of learning model on TVET, Workplace Learning and entrepreneurship, Innovationon applied engineering and information technology, Management and Leadership on TVET, Vocational and Technical Teaachers education, and Assessment and Evaluation on TVET.

Sustainable society shoul be followed by the improvement of various factors that have impacts to the quality of vocational and technical education and training, particularly to overcome the competitiveness of the world business. As we have already known the rapid change of technology as well as the change of demography, having a great effects to the life of peoples in this world, The competitiveness need a collaborativeness to survive the life of millions peoples who lost their jobs. Young peoples as aproductive generation have to be creative and innovative to face the competitiveness. So this prociding contents consist of various findings of research in the field of vocational and technical education as well as applied technology and mainly based on the subthemes of the conference.

Finally, we would like to thank a million for all participants of this conference and all parties who support the success of this conference. Hopefully the seminars and scientific work of this seminar can be a reference material for basic education and elementary school teacher education in Indonesia.

Padang, July 2, 2018

Tim Editor

CONTENT PROSIDING ICTVET 2017 REPOSITORY UNP

1. THE PROSPECT OF OFFSHORE IRON SAND IN TIRAM BEACH PADANG PARIAMAN REGENCY WEST SUMATERA
   Adree Octova, Ansosry, Yoszi Mingsi Anaperta and Indah Elok Mukhlisah 1-7

2. OPTIMIZE OF LEAST-SQUARE INVERSE CONSTRAIN METHOD OF GEOELECTRICAL RESISTIVITY WENNER-SCHLUMBERGER FOR INVESTIGATION ROCK STRUCTURES IN MALALAK DISTRICTS OF AGAM WEST SUMATRA
   Akmam, Amir Harman, Putra Amali 8-13

3. CLUSTER ANALYSIS DISTANCE INTER DISTRICT USING SINGLE LINKAGE METHOD FOR DETERMINATION OF MPLIK CAR OPERATION ZONE IN MEDAN CITY
   Ali Ikhwan, Yasmin Mohd Yacob, Solly Aryza 14-16

4. EFFECT OF MIND MAPPING LEARNING METHODS ON LEARNING OUTCOMES
   Almasri 17-21

5. DESIGN OF SKILL ASSESMENT IN COMPUTER NUMERICAL CONTROL PROGRAMMING SUBJECT
   Ambiyar, Febri Prasetya, Yufrizal 22-26

6. MODIFICATION OF INPUT PUSHER ASSEMBLY OF LASER MARKING MACHINE
   Arif Rahman Hakim 27-34

7. COLLABORATIVE PROJECT-BASED LEARNING: AN INSTRUCTIONAL DESIGN MODEL IN THERMODYNAMICS ON TECHNICAL VOCATIONAL EDUCATION AND TRAINING (TVET)
   Arwizet K, Nizwardi Jalinus, Krismadinata 35-39

8. DEVELOPMENT OF EMPLOYEE INFORMATION SYSTEM-BASED WEB IN MAN 1 PADANG
   Asrul Huda, Rendy Harisca 40-46

9. DECISION SUPPORT SYSTEM (DSS) WITH WP AND MFEP METHODS IN SELECTION OF BEST BABY CLOTHES
   Asyahri Hadi Nasyuha, Rahmat Sulaiman Naibaho, Saniman 47-53

10. IMPROVING LEARNING MOTIVATION THROUGH IMPLEMENTATION PROBLEM SOLVING LEARNING STRATEGY
    Budi Syahri, Primawati, Syahrial 54-58

11. THE MODELING OF MASSIVE LIMESTONE USING INDICATOR KRIGING METHOD (CASE STUDIES OF MASSIVE LIMESTONE IN PT SINAR ASIA FORTUNA)
    Dedi Yulhendra, Yoszi Mingsi Anaperta 59-65

12. ELECTRONIC COMPONENT TESTER AS A LEARNING MEDIA FOR CLASS X STUDENTS AUDIO VIDEO ENGINEERING SMKN 1 SUMBAR
    Delsina Faiza, Thamrin, Ahmaddul Hadi, Yongki Saputra 66-74

13. EFFECTIVENESS OF INTERACTIVE INSTRUCTIONAL MEDIA ON ELECTRICAL CIRCUITS COURSE: THE EFFECTS ON STUDENTS COGNITIVE ABILITIES
Doni Tri Putra Yanto, Sukardi, Deno Puyada 75-80

14. EVALUATION OF LEARNING PROCESS USING CIPP MODEL
Dwi Sudarno Putra, Misra Dandi Utama, Dedi Setiawan, Remon Lapisa, Ambiyar 81-86

15. IMPLEMENTATION OF CONTEXTUAL TEACHING AND LEARNING ON ANALYZING ELECTRICAL CIRCUITS SUBJECT
Dwiprima Elvanny Myori, Citra Dewi, Erita Astrid, Ilham Juliwardi 87-91

16. DOMESTIC EMPLOYMENT PROCESSING SYSTEM ON WORKING PROTECTION AND TRANSMIGRATION USING GEOGRAPHIC INFORMATION SYSTEM (GIS)
Eddis Syahputra Pane, Kori Cahyono 92-98

17. CONDUCTING LABOR MARKET ASSESSMENT IN ENGINEERING CURRICULUM DEVELOPMENT
Edi Septe, Suryadimal, Wenny Marthiana, Nizwardi Jalinus, Ramli..... 99-105

18. DIFFERENCES IN LEARNING OUTCOMES IN THE PRACTICE OF MICROCONTROLLER SYSTEM USING MCS51 MICROCONTROLLER TRAINER KIT
Edidas, Dedy Irfan..... 106-108

19. MICROCONTROLLER SKILL TRAINING FOR SMKN 2 PAYAKUMBUH AND SMKN 1 SUNGAI RUMBAI
Edidas, Legiman Slamet and Ilmiyati Rahmy Jasril..... 109-113

20. THE EFFECT OF ISLAMIC WORK ETHICS AND SPRITUAL LEADERSHIP ON EMPLOYEE'S COMMITMEN IN PADANG SHARIA HOTELS
Eka Mariyanti, Rasidah Nasrah..... 114-120

21. THE DESIGNING OF THE PROTOTYPE OF THE AIR QUALITY MEASURING HELMET
Eko Hariyanto, Solly Ariza Lubis, Zulham Sitorus, M. Iqbal..... 121-124

22. REVIEW DEVELOPING OF PROJECT BASED AS INNOVATION INSTRUCTIONAL
Eko Indrawan 125-130

23. IMPROVING THE ESP STUDENTS' VOCABULARY BY USING PICTURES IN CIVIL ENGINEERING STUDY PROGRAM AT FIRST SEMESTER OF EKASAKTI UNIVERSITY PADANG
Elda Martha Suri..... 131-133

24. INTEGRATED SERVICES SYSTEMS ELECTRONIC DEVELOPMENT FACULTY OF ENGINEERING PADANG STATE UNIVERSITY BASED ON JAVA DESKTOP
Elfi Tasrif, Asrul Huda..... 134-137

25. THE EFFECT OF STRATEGY OF TRAINING MODELS IN LEARNING ELECTRICAL INSTALLATION
Elfizon, Syamsuarnis, Oriza Candra..... 138-141

26. SOFTWARE DEVELOPMENT OF CONCENTRATION SELECTION WITH INTEREST TEST BASED ON INTELLIGENT SYSTEM
Elin Haerani 142-149

27. NEEDS ANALYSIS ON INCREASING COMPETENCY TEST RESULTSSTUDENTS IN S1 PROGRAM OF PUBLIC HEALTH SCIENCESSTIKES HANG TUAH PEKANBARU
Emy Leonita, Nopriadi, Ahmad Satria Efendi, and Niswardi Jalinus 150-155

28. THE READINESS OF STUDENT TO ENTREPRENEUR THROUGH INCORPORATION OF THE PILOT PROJECT PRACTICE
Ernawati 156-161

29. EFFECT OF PROJECT BASED LEARNING MODEL IN IMPROVING STUDENT LEARNING RESULT
Erwinsyah Simanungkalit 162-166

30. DESIGNING LEARNING TOOLS BY USING PROBLEM BASED INSTRUCTION (PBI) MODEL ON ENERGY RESOURCE MATERIAL INTEGRATED TO ENERGY SAVING CHARACTER
Estuhono 167-170

31. THE DESIGN OF LECTURER PERFORMANCE EVALUATION MODEL BASED ON ANALYTIC NETWORK PROCESS (ANP)
Fenny Purwani, Nizwardi Jalinus, Ambiyar 171-175

32. DEVELOPMENT OF ONLINE EXAMINATION SYSTEM USING WONDERSHARE QUIZCREATOR BASED ON WEB
FitriYanti, Rijal Abdullah, Krismadinata 176-180

33. THE VALIDITY OF TRAINERON MATERIALS SCIENCE AND DEVICESSUBJECTAT DEPARTMENT OF ELECTRICAL ENGINEERING
Fivia Eliza, Dwiprima Elvanny Myor, Hastuti 181-185

34. TRAINING MODEL-BASED KNOWLEDGE MANAGEMENT SYSTEM FOR VOCATIONAL HIGH SCHOOL TEACHERS SKILLS ENGINEERING COMPUTER NETWORK
Gunawan Ali, Kasman Rukun, Syahril 186-193

35. FUZZY LOGIC BASED CONTROLLER FOR BUCK CONVERTER
Habibullah, Irma Husnaini, Asnil 194-200

36. A NEW DESIGN OF HANDLESS STIRRED DEVICE
Hanne Aulia, Riki Mukhaiyar 201-204

37. ACADEMIC INFORMATION SYSTEM OF STIKES PERINTIS PADANG
Harleni, Marisa 205-209

38. DESIGN OF ELECTROMAGNETIC REGENERATIVE SHOCK ABSORBER AS A TOOL OF HARVESTING VIBRATION ENERGY ON VEHICLE
Hasan Maksum, Aslimeri, Putra Jaya, Wanda Afnison 210-213

39. THE EFFECTIVENESS OF USING POSTER AND VIDEO MEDIA IN EDUCATION ABOUT DANGERS OF SMOKING ON KNOWLEDGE AND ATTITUDES OF SENIOR HIGH SCHOOL 12 PEKANBARU STUDENTS
Hastuti Marlina, Reno Renaldi 214-217

40. A MODEL PREVENTIVE MAINTENANCE CONTROL IN THE MACHINE TURNING AT WORKSHOP THE FACULTY OF ENGINEERING OF THE STATE UNIVERSITY IN PADANG
Hefri Hamid, Nizwardi Jalinus, Syahril, Ambiyar, Febri Prasetya 218-224

41. INVESTIGATION OF CHEMICAL FEASIBILITY AND DISTRIBUTION OF IRON SAND RESERVE REGIONAL AREA OF AGAM DISTRICT FOR CEMENT RAW MATERIAL IN PT. SEMEN PADANG
Heri Prabowo, Sumarya..... 225-227

42. THE DEVELOPMENT OF INTERACTIVE MULTIMEDIA-BASED LEARNING MEDIA USING ADOBE FLASH CS3 AND CAMTASIA IN PROBLEM-SOLVING LEARNING IN ELEMENTARY MATHEMATICS OF IN STUDENT PGSD STKIP ADZKIA IN PADANG
Ika Parma Dewi, Lativa Mursida, Rizkayeni Marta..... 228-235

43. ART EDUCATION THROUGH FREE EXPRESSION APPRECIES, DISCIPLINE SCIENCE, AND MULTICULTURAL AS EFFORTS TO IMPROVE STUDENT CREATIVITY
Indra Irawan 236-242

44. THE INFLUENCE OF USING ANIMATION MEDIA AND LEARNING MOTIVATION TOWARD LEARNING RESULT OF AUTOMOTIVE STUDENTS IN SMK N 2 PAYAKUMBUH
Indra Wahyu, Fahmi Rizal, Rijal Abdullah..... 243-248

45. INFORMATION SYSTEM AND REPORT VALUE PROCESSING BASED MICROSOFT VISUAL BASIC 6.0 ON SENIOR HIGH SCHOOL (CASE STUDY AT SMAN 12 PADANG)
Indra Wijaya, Isra Mouludi, Fandy Neta, Yaslinda Lizar, Satria Ami Marta 249-256

46. DESIGN OF SIMULATOR FOR REPLACEMENT OFTOOLSPRACTICE DIGITAL ENGINEERING IN THE VOCATIONAL SCHOOL
Irwan Yusti, Ganefri, Ridwan 257-259

47. CELL ROTATION TO RESOLVE THE WEAKEST CELL DAMAGE IN THE BATTERY PACK IN DISCHARGING PROCESS
Irwanto Zarma Putra, Citra Dewi 260-263

48. IMPROVEMENT OF CONCRETE QUALITY WITH ADDITION OF SUNUA PASIR PADANG PARIAMAN WEST SUMATRA
Iskandar G. Rani, Widya Salmita..... 264-268

49. SIMPLE WATER PURIFIER USING MULTILEVEL SYSTEM
Jasman, Nelvi Erizon, Syahrul, Junil Adri, Bulkia Rahim..... 269-272

50. DESIGN OF LIBRARY INFORMATION SYSTEM USING BARCODE ON SMAN 1 SOLOK CITY
Jeprimansyah 273-280

51. THE DESIGN OF THE SIGNAL MEASUREMENT DEVICE OF BODY'S BIOELECTRICAL IMPEDANCE By USING THREE ELECTRODES
Juli Sardi, Hastuti, Ali Basrah Pulungan 281-286

52. PATIENT INFORMATION SYSTEM DESIGN ON MATERNITY HOSPITAL RESTU IBU PADANG
Jusmita Weriza 287-293

53. IDENTIFICATION THE IMPORTANCE OF LEARNING TOOLS DEVELOPMENT ON ENERGY-EFFICIENT BUILDING INNOVATIONS USING ROOT CAUSE ANALYSIS
Kemala Jeumpa 294-297

54. DECISION SUPPORT SYSTEM FOR RECOMENDATION CERTIFICATION TEACHER ON VOCATIONAL HIGH SCHOOL
Khairul, Rahmad Budi Utomo 298-302

55. IMPACT OF THE TWI LEARNING MODEL IN LEARNING STONE AND CONCRETE CONSTRUCTIONS ON VOCATIONAL EDUCATION
Kinanti Wijaya, Daniel IrvansiusTampubolon 303-307

56. THE EFFECT OF SOFTWARE MASTERCAME TOWARD MECHANICAL ENGINEERING STUDENTS PERFORMANCE IN MAKING PRODUCT WITH CNC MILLING MACHINE IN VOCATIONAL HIGH SCHOOL 1 PADANG
Kms. Muhammad. Avrieldi, Suparno, Nofri Helmi 308-310

57. LEARNING BROADCAST VIDEO SYSTEM WITH H264 VIDEO ENCODING RASPBERRY PI
Leni Marlina, Aswandi 311-315

58. OPTIMIZATION OF EXTERNAL LIGHTNING PROTECTION SYSTEM DESIGN IN BUILDING CENTER FOR INFORMATION TECHNOLOGY AND DATA BASE (PTIPD) UIN SUSKA RIAU
Liliana, Afriani, Anwardi 316-322

59. A NEW MODEL MOBILE LEARNING MANAGEMENT SYSTEM BASED ON MOODLE IN UNIVERSITY
Lita Sari Muchlis, Kasman Rukun, Krismadinata, Yahfizham 323-327

60. DEVELOPMENT OF MECHANICAL TECHNOLOGY LEARNING MODULE PROGRAM EXPERTISE OF SMK ENGINEERING
M. Giatman, Waskito, Maruli Sihombing 328-332

61. SECURITY OF MEDICAL RECORD WITH RIVEST SHAMIR ADLEMAN (RSA) METHOD
M.Syaifuddin, Ahmad Fitri Boy, Ali Ikhwan 333-336

62. RAHMATAN LIL ALAMIN, THE CONCEPT OF MULTICULTURAL EDUCATION
Muh. Barid Nizarudin Wajdi, Achmad Fathoni Rodli 337-340

63. LESSON STUDY FOR IMPROVING A LEARNING QUALITY
Muh. Barid Nizarudin Wajdi, Andi Mursidi 341-345

64. THE ROLE OF INFORMATION TECHNOLOGY IN THE IMPROVEMENT OF TEACHER'S COMPETENCIES AND TEACHING LEARNING PROCESS EFFECTIVENESS IN ESA SEJAHTERA SCHOOL PEKANBARU
Muhammad Luthfi Hamzah, Hamzah, Astri Ayu Purwati 346-350

65. IMPLEMENTATION OF PROJECT BASED LEARNING MODEL IN COURSE WEB DESIGN
Muhammad Sabir Ramadhan, Neni Mulyani, Muhammad Amin 351-357

66. MEASUREMENT MODEL OF CONTRIBUTED FACTOR AND INDICATOR TOWARDS VOCATIONAL EDUCATION PRODUCTIVITY
Mulianti, Ambiyar, Generousdi and Rodesri Mulyadi 358-364

67. ORNAMENTS ON THE TRADITIONAL ACEHNESE HOUSE IN CENTRAL ACEH, ACEH PROVINCE
N Novita, M Mukhirah, R Dewi, Fitriana, F Noer, F Fadillah, E Erni 365-368

68. DESIGNING STRATEGY MAPS FOR PRIVATE ENGINEERING COLLEGE
Nanang Alamsyah, Larisang, Muhammad Ansyar Bora 369-376

69. DESIGN OF INTERACTIVE MEDIA INTERACTIVE EYE LESSONS FOR CLASS III SD N 04 BARINGIN PADANG CULTURAL CULTURAL FLOOR BASED ON MULTIMEDIA
Nelda Azhar, Putra Jaya, Asrul Huda, Etika Fahmidyah 377-383

70. DEVELOPMENT OF MALAY FRUIT ORNAMENT
Netty Juliana 384-387

71. THE CONTRIBUTIONS OF DISCIPLINE AND ENVIRONMENTAL KNOWLEDGE ON CLEAN BEHAVIOR OF STUDENTS IN PUBLIC ELEMENTARY SCHOOL KAMPUNG BARU PARIAMAN, WEST SUMATERA
Nurhasan Syah, Sanny Edinov 388-393

72. ANALYSIS OF VOLUME AND STRONG CONCRETE IMPROVEMENT ON NON-SAND CONCRETE MIXED WITH ADDITION BAKING POWDER
Nurmaidah 394-398

73. BRACING CROSS SECTION EFFECT TO DISSIPATION ENERGY BY NUMERICAL ANALYSIS
Prima Zola, Rahmat, Fitra Rifwan 399-405

74. DEVELOPMENT OF MODEL OF PROPELLER-CROSS FLOW WATER TURBINE FOR PICO HYDRO POWER GENERATORTITLE
Purwantono, Refdinal, Hendri, Syahrul 406-408

75. THE POTENTIAL OF RENEWABLE ENERGY (STUDY CASE IN TOMUAN HOLBUNG VILLAGE, ASAHAN REGENCY OF SUMATERA UTARA PROVINCE)
Rahmaniar, Agus Junaidi 409-413

76. VIRTUAL LAB IMPLEMENTATION QOS METAROUTER ON COMPUTER NETWORK LEARNING
Raimon Efendi 414-418

77. BLASTING DESIGN DEVELOPMENT AREA DECLINE CIBITUNG AND CIKONENG UNDERGROUND MINE PT CIBALIUNG SUMBERDAYA BANTEN
Raimon Kopa, Afdhal Husnuzan, Bambang Heriya 419-423

78. ANALYSIS OF LEARNING COMPETENCY ENGINEERING STUDENTS VOCATION D 3 FT UNP
Ramli, Febri Prasetya 424-429

79. FACTORS AFFECTING THE AUTOMOTIVE ENGINEERING STUDENTS' INTEREST ON TEACHING PROFESSION
Rasinov Chandra, Anggi Aprianto, Mawardi, Reza Rahmadani 430-435

80. AN EXPERIMENTAL STUDY ON THE EFFECT OF CENTRIFUGAL CLUCTH COOLING GROOVE ON MOTORCYLCE PERFOMANCE
Remon Lapisa, Hendika Syahputra, Irma Yulia Basri, Rifdarmon, Hendra Dani Saputra 436-440

81. EXPERT MODEL SYSTEM ON ENTREPRENEURSHIP PERSONALITY
Resmi Darni, Z. Mawardi Effendi and Selamat Triono 441-446

82. THE ANALYZED OF TAR AS WASTE MATERIAL OF BITUMINOUS COAL GASIFICATION BY USING GASCHROMATOGRAPHY
Rijal Abdullah and Hengki Ade Satria 447-450

83. EMPLOYEE PRODUCTIVITY IN TWO CROSS CULTURES BASED ENTREPRENEURSHIP
Riki Adriadi, Ganefri and Fahmi Rizal 451-455

84. DEVELOPMENT OF INTERACTIVE MULTIMEDIA CD OF INSTRUCTIONAL MEDIA ON BUILDING CONSTRUCTION
Rizky Indra Utama, Nurhasan Syah, Rijal Abdullah 456-458

85. MULTIMEDIA INTERACTIVE IN WEB PROGRAMMING SUBJECTS
Rusli Saputra, Sophan Sophian, Delia Putri 459-464

86. PREDICTED VULNERABILITY ASSESSMENT OF NON ENGINEERED HOUSES BASED ON DAMAGE DATA OF THE 2009 PADANG EARTHQUAKE IN PADANG CITY, INDONESIA
Rusnardi Rahmat Putra, Junji Kiyono and Aiko Furukawa 465-472

87. TWO SPECIES OF TERMITE DAMAGING TO BUILDING AND HOUSES AT BANDA ACEH (SUMATRA, INDONESIA)
S Syaukani, M Bahi, M Muslim, M Shabri Abd Majid, D Sutekad, Y Yasmin, N Novita 473-476

88. PERSONNAL MANAGEMENT IN INFORMATION SYSTEMS APPLICATIONS WITH TOGAF FRAMEWORK
Safrian Aswati, Saleh Malawat, Suhendra, Iskandar, Yessica Siagian, Arridha Zikra Syah 477-482

89. ANALYZING OF TECHNICAL CUTTING OF EMPTY PALM BUNCHES
Safril, Dedi Wardianto 483-492

90. DESIGNING AND MANUFACTURE OF RADIUS PAJI HAIRERS (PAHAT RADIUS POST) ON LATHE MACHINE FOR LABORATORY AND MODULES TEACH
Saiful Anwar, Rindi Genesa Hatika, B.Herawan Hayadi 493-498

91. MATERIAL SELECTION ANALYSIS AND MAGNET SKEWING TO REDUCE COGGING TORQUE IN PERMANENT MAGNET GENERATOR
Sepannur Bandri, M. Aldi Tio 499-506

92. COMPARISON OF DECISION TREE ALGORITHM METHOD (C4.5) AND NAIVE BAYES TO IDENTIFY STUDENT LEARNING RESULTS WITH COOPERATIVE LEARNING MODEL
Sri Restu Ningsih 507-511

93. ONLINE ASSESSMENT TOOLS FOR 2013 CURRICULUM BASE ON INFORMATION TECHNOLOGY
Suartin, Hambali, Oriza Chandra 512-517

94. GAME BASED LEARNING TO IMPROVMENT TEACHERS KNOWLEDGE FOR TEACHING STRATEGY IN THE CLASS
Suherman 518-523

95. LEARNING RESPONSE OF JOURNEY LEARNING COOPERATIV LEARNING AND LEARNING MODULE IN EDUCATION MEDIA LEVEL
Suparno, Bulkia Rahim, Zonny Amanda Putra, Junil Adri, Jasman 524-528

96. NEED ANALYSIS APPLICATION ON THE FEASIBILITY STUDY OF THE HYDROELECTRIC POWER SELECTION (CASE IN SOLOK, PESISIR SELATAN AND SIJUNJUNG REGENCY)
Suryadimal, Edi Septe, Wenny Martiana, Fahmi Rizal, Nizwardi Jalinus 529-534

97. DEVELOPING SOFT SKILLS LEARNING MODELFOR MECHANICAL ENGINEERING STUDENTS OF VOCATIONAL HIGH SCHOOL
Suryo Hartanto 535-538

98. IMPACT OF WORK-BASED LEARNING OF CONCRETE STONE WORK PRACTICE ON DIPLOMA-III CIVIL ENGINEERING STUDENTS
Syafiatun Siregar 539-543

99. DEVELOMPENT OF WEB-BASED DECISION SUPPORT SYSTEM FOR SCHOLARSHIP RECIPIENTS SELECTION USING ANALYTICAL HIERARCHY PROCESS (AHP) METHOD
Titi Sriwahyuni, Dedi Irfan, Ika Pharma Dewi and Hanny Maharani 544-552

100. EFFECT OF ENGINE TEMPERATURE CHANGES ON INJECTION TIME OF FUEL AND GAS EMISSION OF GASOLINE ENGINE
Toto Sugiarto, Dwi Sudarno Putra, Wawan Purwanto 553-557

101. EARTHQUAKE AND TSUNAMI DISASTER MITIGATION TRAINING FOR ELEMENTARY SCHOOL STUDENTS IN THE COASTAL AREA OF PADANG PARIAMAN DISTRICT WITH KYOTO INTERNATIONAL DISASTER PREVENTATION SCHOOL METHOD
Totoh Andoyono, Fitra Rifwan, Revian Bodi, Prima Zola, Annisa Prita 558-560

102. FUNCTIONAL MEMBERSHIP ANALYSIS OF FUZZY INFERENCE SYSTEM SUGENO IN ANEMIA CLASSIFICATION
Tri Monarita Johan 561-563

103. DEVELOPMENTAL OF MEDIA LEARNING BASED ON TUTORIAL VIDEO AT CHARACTER MAKE UP SUBJECT IN SMKN 6
TyasAsih Surya Mentari, MurniAstuti, and Linda Rosalina 564-570

104. PSYCHOLOGICAL FACTORS INFLUENCING THE DECISION MAKING OF PURCHASING PRODUCTS VIA ONLINE
Ulfa Annida Damanik, Sri Wening 571-577

105. IMPROVING TEACHERS' PROFESIONALISM APPROPRIATE TO NEW CURRIRULUM 2017 FOR VOCATIONAL SCHOOLS BY CAPACITY BUILDING AND WORKSHOP ABOUT PREPARING LOCAL GOVERNMENT FINANCIAL STATEMENT; AN EXPERIMENTAL STUDY ON ACCOUNTING TEACHERS' FROM VOCATIONAL SCHOOLS IN WEST SUMATERA PROVINCE
Vita Fitria Sari, Mayar Afriyenti, Mia Angelina Setiawan 578-585

106. THE DEVELOPMENT OF VIT (VOCATIONAL INTEREST TEST) MODEL USING DECISION SUPPORT SYSTEM (DSS) TECHNIQUE
Vitriani 586-590

107. ANALYSING INFORMATION SYSTEM OF ACADEMIC SERVICES IN THE UNIVERSITY
Wahyu Prima, Ganefri, Krismadinata 591-595

108. RESOURCE SHARING–BLENDED PROJECT BASED LEARNING (RS-BPBL©) MODEL DEVELOPMENT IN VOCATIONAL HIGH SCHOOL
Wahyudi 596-602

109. DEVELOPMENT ASSESSMENT MODEL TO HIGH ORDER THINKING SKILL ORIENTATE FOR EVALUATION STUDENT COMPETENCY
Wakhinuddin S, Bahrul Amin, Waskito 603-605

110. USE OF GEARBOX VIAR ON FISHING SHIPS
Wakhinuddin S, Donny Fernandez, Andrizal, M Nasir, Rifdarmon 606-609

111. THE APPLICATION OF SIMPLE STRAIN GAUGE DYNAMOMETER IN LEARNING STYLE CUTTING LATHE
Wenny Marthiana, Suryadimal, Edi Septe, Duskiardi, Andika 610-613

112. DESIGN OF ANDROID BASED INTERACTIVE BOOK IN INTEGRATED ISLAMIC ELEMENTATY SCHOOL OF LAN TABUR PAGARALAM CITY
Yadi, Efan, Sigit Candra Setya 614-617

113. SMART CLASSROM DESIGNS IN THE SMART EDUCATIONAL ENVIRONMENT
Yasdinul Huda, B Herawan Hayadi 618-626

114. BUILD AND DESIGN OF BUSINESS INTELLIGENCE UNIVERSITY SYSTEM AS DECISION SUPPORT ACADEMIC
Yaslinda Lizar, Asriwan Guci 627-636

115. SOIL STABILITY USING CEMENT PCC IN LUBUK MINTURUN PADANG, INDONESIA
Yocky Syaida Adha Putra, Tengku Ahmad Fauzan Syah 637-642

116. INFLUENCE THE LEARNING STRATEGY AND ENTRY BEHAVIOR TO YIELD LEARNING BUILDING CONSTRUCTION AND DRAWING 1 OF STUDENT
Yuwalitas Gusmareta, Fahmi Rizal, Nurhasan Syah..... 643-646

117. IMPLEMENTATION OF DISASTER PREPARED SCHOOL (SSB) IN WEST PASAMAN DISTRICT WEST SUMATERA PROVINCE
Yuwalitas Gusmareta, NurhasanSyah, Laras Andreas Oktavia, RizkyIndraUtama, MuviYandra..... 647-649

118. USING MOBILE TELECOMMUNICATIONS -2000 INTERNATIONAL FOR ANALYZING TECHNOLOGY NETWORK ERA 4G-LTE
ZulhamSitorus, Ganefri, NizwardiJalinus 650-653

119. FACTORS AFFECTING STUDENTS IN CHOOSING COMPUTER ENGINEERING DEPARTMENT IN STT PAYAKUMBUH
Zulkifli, Dilson, Rahmad Al Rian 654-659

120. FACTORS EFFECTING ELEMENTARY SCHOOL TEACHER READINESS ON IMPLEMENTING CURRICULUM IN WEST SUMATERA
Zuryanty, Hamimah, Mulyani Zein..... 660-665

MICROCONTROLLER SKILL TRAINING FOR SMKN 2 PAYAKUMBUH AND SMKN 1 SUNGAI RUMBAI

Edidas[1], Legiman Slamet[2] dan Ilmiyati Rahmy Jasril[3]

[1]Department of Electronic Engineering , Fakultas Teknik,

Universitas Negeri Padang

Abstract: This paper describes microcontroller skill training for SMKN 2 Payakumbuh and SMKN 1 Sungai Rumbai. This training aims to train students to be skilled at creating microcontroller circuits and programs. The training method is the direct practice of creating and programing the microcontroller system. The result is the improvement of microcontroller skill of the students who participated in this training.

Keyword: Microcontroller Skill, Direct Practice.

1. INTRODUCTION

In vocational syllabus design and assembly as well as programming the microcontroller is a competence that must be mastered by the student areas of Electrical and Electronics engineering expertise also includes Automotive. One package of existing expertise in SMKN 2 Payakumbuh dan SMKN 1 Sungai Rumbai is Power Installation Engineering and Mechanical Light Vehicle. In the syllabus of each package contained expertise Basic Competency (Kompetensi Dasar) on Microcontroller Competence. Microcontroller Basic competence is a competence that is very complicated but not difficult to learn by students of SMK. However, to make students master microcontroller properly, it should be the teachers involved in the teaching competence enhanced microcontroller (upgrade). Increased mastery of microcontroller for teachers of SMK 2 Payakumbuh dan SMKN 1 Sungai Rumbai is planned through the institution of Community Services on Universitas Negeri Padang at academic year 2016/2017.

2. SITUATION ANALYSIS

General portraits of the description of, profiles and conditions of target audiences to be involved in community service are seen through situational analysis. Situation analysis is an important part of the content of community service proposals that are activities of the application of Science, Technology and the Arts (IPTEKS). Looking at current technological developments almost all areas of expertise require controls made from microcontrollers. For example in the field of electrical expertise to control: Washing Machine, Air Conditioning (AC) and others. Electronics expertise such as controlling Television, Mobile, DVD player and others. In the field of Automotive for ignition control and oil flow in car engines. Similarly, other areas of expertise such as Informatics Engineering, Mechanical Engineering, and Building Engineering are not behind in utilizing the ability of the microcontroller in controlling the aircraft and its equipment. Thus the competence that must be mastered by a graduate of SMK not only competence in the field of expertise but also must master the control using a microcontroller.

In the syllabus, SMK microcontroller Design and assembly, programming is a competence that must be mastered by students in the field of Electrical and Electronics engineering expertise also including Automotive. One of the expertise packages that exist in SMKN 2 Payakumbuh and SMKN 1 Sungai Rumbai is Electricity Installation Technique and Light Vehicle Technique. In the syllabus of each skill package, there is Basic Competence (Kompetensi Dasar) about Microcontroller Competency. Basic Competency Microcontroller is a very complicated competence but not too difficult to learn by vocational students.

However, to be able to master the microcontroller well and correctly, then the students should be involved in teaching the competence of microcontroller upgrade. Increased mastery of microcontroller material for students SMKN 2 Payakumbuh and SMKN 1 Sungai Rumbai planned through the Institute of Community Service State University of Padang academic year 2016/2017

3. AIM

Based on the background and formulation of the above issues, the purpose of this educational / training activity is to improve the ability of mastery of microcontroller skills for students of SMK in the field of expertise that intersect with control using a microcontroller.

4. BENEFITS

Benefits of training the students SMK N 2 Payakumbuh and SMKN 1 Sungai Rumbai is able to increase student competence in the field of Microcontroller, thus increasing students' insight into the modern control system.

5. LITERATUR REVIEW

Training is one way to learn a skill. Education and Training is a learning activity within a short period of time that is expected to increase the ability of participants in certain skills. Skill training can be interpreted as a systematic and measurable way given to a person to acquire a particular skill.

Mastery of skills is measured in three elements, namely: knowledge (knowledge), attitude (attitude) and skills (psychomotor). Skills that are generally called competence is needed in the preparation of a job. Education and Skills Training is part of education that is to acquire or enhance knowledge to meet the requirements of an occupation that goes beyond the formal education system in relatively singular time and by prioritizing practice rather than theory.

In accordance with technological developments in the field of current control, both in hardware and software, almost most of the control system do with the help of Microcontroller. By using a microcontroller in the control system can be made a control system that is very simple but more powerful.

According to Moh. Ibnu Malik and Anistardi (1997: 1) write that microcontroller is a single chip microcomputer (SCM). This is because the microcontroller IC is able to work like a microcomputer although only a chip component only. For more complete understanding then in this book is defined that the microcontroller is a chip-shaped electronics components or Integrated Circuit (IC) in which there is a series of microprocessors and other support circuits that enable this component can work like a computer on a limited scale. Because of the ability that microcontrollers have that can work like a computer then the microcontroller is given the nickname as a computer in one IC or in Single Chip Computer English (SCC). Then Durham (2004: 4) mentione that: “A Microcontroller is a microprocessor with additional interface components as part of the chip. In essence, a microcontroller is designed to connect directly to the input and output. In addition, it has some memory as part of the chip. In some cases, these are also called single chip computers”. In general, the microcontroller parts are as shown in Figure 1. Those sections are data center or central procesing unit (CPU), ROM, RAM, Timer and Input Output (I / O) port data channels.

The block diagram of microcontroller architecture of MCS51 is like Figure 1. In it can be seen the parts of MCS51 microcontoler. The three types of MCS51 microcontroller ICs (AT89S51, AT89S52 and AT89S55) have the same inner construction, the difference lies in the PEROM Flash capacity and the number of ports. Microcontroller MCS51 requires only 3 additional capacitors, 1 resistor and 1 Xtal and a 5 Volt 1 Ampere power supply to assemble the circuit so it can work. A series of microcontrollers that can run certain control programs is called a minimum system microcontroller circuit. A 10 Farad Micro Capacitor and a 10 Kilo Ohm resistor coupled to produce a momentary reset pulse on the foot Reset

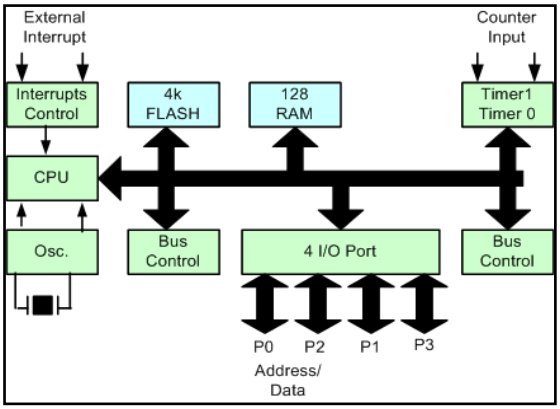

Figure 1. Diagram Block Microcontroller AT89S51

The reset pulse is a minimum positive square wave of 2 clock spins or 2 micro seconds (if using 12 MHz chips). The reset pulse will make the program counter program (Program Counter Register) to be re-run address 0000H. Resets the program to make the program run from scratch. The RC reset circuit serves as an automatic reset by utilizing a 10 uF capacitor charging time coupled with a 10K resistor. The length of charging time of a capacitor is 5 times the time constant of the RC circuit. The reset pulse will make the program counter program (Program Counter Register) to be re-run address 0000H. Resets the program to make the program run from the beginning.

Port P0, Port P1, Port P2, Port 3, Timer 0, Timer 1 and other means are physically registered registers specially placed in the Special Function Register (SFR) location. The location of the SFR register is the same as the 128 RAM address starting from the 80H address to the FFH. Although it has the same address, the program will not mis use it, as it is differentiated how to access it. As shown in Figure 2. above to access RAM 128 over used indirect access (indirect acces) while to access SFR is done by direct access (direct access). What and how direct and indirect access will be explained in the instruction section of the microcontroller.

The SFR map can be seen in Figure 2. In the locations shown on the SFR map the address of each register and its original content (default) can be found. As the port register P0 resides at the location of RAM 80H and the initial contents of the register is 1111 1111. The location of address P1 is 90H, P2 at address A0H and P3 at address B0H. All Port registers have a default value of 1111 1111. Drai 128 locations of the SFR map register address are currently not fully loaded. Locations filled in are visible on the map. Make sure you can memorize the register names and address locations of each register in the SFR map.

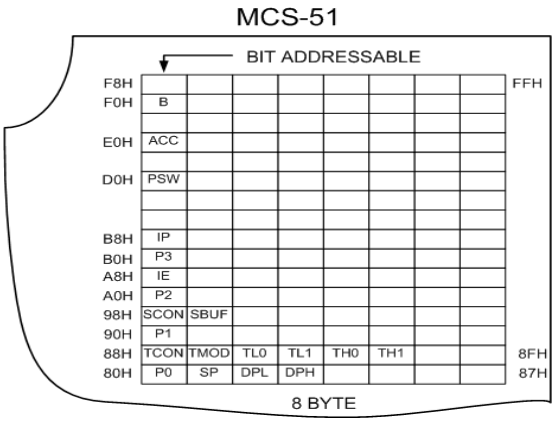

Figure 2. Map of Special Function Register

3. Microcontroller Hardware Assembly

To assemble a microcontroller systems based on the circuit scheme that has been designed it needs 5 certainties as follows:

1. Make sure the 5 VDC power supply is plugged into pin 40 and GND is connected to pin 20.
2. Make sure the crystal is connected properly on pins 18 and 19.
3. Make sure the Reset circuit (either manual or automatic circuits) is properly connected to pin 9.
4. Make sure pin 31 (pin EA) is connected to 5 VDC.
5. Make sure the load used is connected to the correct port on the I / O port (P0, P1, P2 and P3).

How to determine the certainty can be done by performing cold measurement and heat measurement. Cold measurements are measured using the Ohm meter before the power supply is connected. The criterion of the result of measurement is that if the resistance between the point measured 0 Ohm means that the point is connected, but if the resistance is very large (~) then it is said that the two points are not suspended.

As with the heat measurement, the measurement is done when the power supply has been connected to the circuit. The voltage between two points is measured using Voltmeter. Figure 3. is one of the minimum system circuit schemes for LED control on Port P0. Minimum system circuit for Seven segment control, Dot matrix, DC Motor. Motor Stepper, Dummy Sensor input and others can be easily designed through microcontroller control.

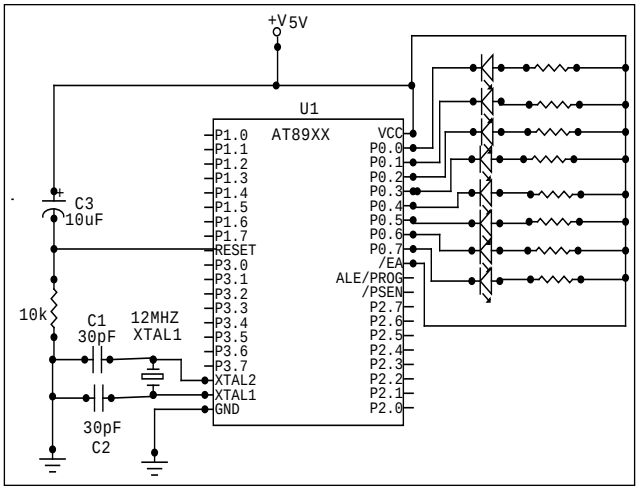

Figure 3. One of the Minimum System circuit schemes for LED Control on Port P0

4. Implementation Method Implementation of Science and Technology

The method of implementation carried out during the execution of this activity, both theoretical and practical are as follows:

a. Discussion Method

The method of discussion is considered appropriate in the delivery of theoretical material. To determine the determination of where the discussion material begins to explore the initial ability. Assessing the participants' initial ability is done through question and answer in the discussion forum.

b. Direct practice

After the trainees get theoretical knowledge, then held the practice directly in the form of planning, assembling and programming microcontroller.

6. RESULTS AND ANALYSIS

Community service activities with IPTEKS implementation program at SMKN 2 Payakumbuh and SMKN 1 Sungai Rumbai by training 60 students have produced a product in the form of MCS51 series of microcontroller circuit kits, in addition to increasing their skills in the field of the microcontroller. Results in the form of a series of MCS51 minimum microcontroller system can be seen in the images as shown in Figure 4. below:

a. The product at SMKN 2 Payakumbuh

b. The product at SMKN 1 Sungai Rumbai

Figure 4 . MCS51 Microcontroller System Circuit Kit

5. CONCLUSION

Community service activity with a program of science and technology implementation in SMKN 2 Payakumbuh and SMKN 1 Sungai Rumbai can be concluded as follows:

1. Microcontroller skill training has succeeded in improving the skills of students as evidenced by the existence of MCS51 minimum system circuit kits that work well.

2. Built partnership and cooperation between the FT UNP and SMK N 2 Payakumbuh and SMKN 1 Sungai Mumbai well.

6. REFERENCES

[1] Datasheet Microcontroller AT89S51. Atmel Corporation, (2008). Diambil pada tanggal 7 Februari 2014 dari dari www.atmel.com/images/doc2487.pdf

[2] Durham, Marcus.O, Ph.D, PE. (2004), Systems Design and the 8051 The hardware, firmware, and software design of microprocessor systems. Tusla OK: Techno Press.

[3] Muhammad Ibnu Malik & Anistarsi. 1997. *Bereksperimen dengan Mikrokontoler 8031*. Jakarta: PT Elekmedia Komputindo.

[4] Panduan Pelaksanaan Penelitian dan Pengabdian Kepada Masyarakat. (2017). Padang: LP2M Universitas Negeri Padang.

7. AUTHOR'S BIOGRAPHY

Edidas is a lecture in the Departement of Electronic Engineering, Universitas Negeri Padang, Sumatera Barat, Indonesia. May contact E-mail is edidasunp@yahoo.com

8. AUTHOR'S CONTRIBUTIONS

Legiman Slamet: Conception, design, acquisition.

Ilmiyati Rahmy Jasril: analysis and interpretation of data and drafting the article.