



**VAAL UNIVERSITY  
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# LEARNER GUIDE

<b>Faculty</b>	Engineering and Technology
<b>Department</b>	Electrical Engineering
<b>Course</b>	Computer Systems
<b>Title</b>	EIPRC4A Work Integrated Learning 3
<b>Compiled By</b>	KT Nshimba
<b>Year</b>	2024
<b>NQF Level</b>	6
<b>Credits</b>	30

## CONTACT DETAILS

DEPARTMENT	OFFICE	E-MAIL ADDRESS	TELEPHONE
Computer Systems Coordinator	R005	nshimba@vut.ac.za	0169507519
Co-operative Education	N000	<a href="mailto:carlen@vut.ac.za">carlen@vut.ac.za</a>	016 950 9161

## GENERAL REQUIREMENTS

- It is the student's responsibility to register for WBL before training commences.
- The student will simultaneously register for EIEXC1A, EIEXC2A and EIPRC4A, which are the three components of workplace-based learning.
- The registration, completion, and submission of reports must be done according to the guidelines on page 4.
- An accredited assessor, appointed by the industry, will assess the project. This assessor must have a qualification equal to or higher than the assessment qualification.
- The student must do the training under the supervision of a mentor, who could also be the assessor if the mentor has the necessary qualifications.
- A VUT-accredited staff member will act as an examiner.
- The assessor must complete page 6, the assessor's declaration (page 9), and the assessment report (pages 8 to 17).
- If the mentor or assessor needs assistance, contact the Computer Systems Coordinator at VUT. (See top of page)
- To fulfil the requirements of the Diploma: Electrical Engineering: Computer Systems, the student must complete all academic requirements, as well as the three Workplace Based Learning components.
- The syllabus Appendix B is a generic WBL syllabus for the study fields of Computer Systems Engineering.
- Graduate Attribute 12 (GA12) is to be covered in this module as part of the requirements of the Engineering Council of South Africa (ECSA). The Computer Systems Engineering Syllabus Appendix B contains a detailed GA explanation.

# REGISTRATION AND REPORT SUBMISSION INSTRUCTIONS

## Workplace-Based Learning (WBL) Registration

Registration procedure:

- Registration for this module (EIPRC4A) should be done simultaneously with modules EIEXC1A and EIEXC2A.
- This project module (EIPRC4A) carries a credit value of 30 and need to be completed within the training period.

## Workplace-Based Learning (WBL) Reports

After you have successfully completed with your WBL 2, take note of the important documents that need to be submitted for WBL 3.

### Submission procedures:

- The project proposal, as well as completed page 4 must be emailed to the VUT Computer Systems Engineering coordinator within the first three weeks after this module of WBL3 commences.
- A progress report giving a summary of your project needs to be submitted midway through your project.
- A well formatted final project document (according to Appendix B) must be submitted when the end of your training period. Make use of appendix C for the project format.
- A completed project rubric document (Appendix A) must be submitted at the end of the training period.

**NB. Refer to section 1.1 below for project proposal guidelines.**

**GENERAL INFORMATION – TRAINING SCHEDULE REPORT  
WBL (EIPRC4A)**

STUDENT NUMBER:		STUDENT'S POSTAL ADDRESS:
INITIALS & SURNAME:		
ID NUMBER:		
E-MAIL:		
TELEPHONE (WORK):		
		CELL PHONE:
COMPANY NAME:		NUMBER OF EMPLOYEES:
DIVISION:		NUMBER OF STUDENTS IN TRAINING:
TRAINING SITE/STREET ADDRESS:		NUMBER OF ECSA REGISTERED STAFF:
		COMPANY'S SPECIALIZATION FIELD OR PRODUCTS
ASSESSOR INITIALS & SURNAME:		ACCREDITED ASSESSOR: Y / N
E-MAIL:		CELL OR TELEPHONE:
WBL START DATE:		END DATE:

STUDENT SIGNATURE:	
ASSESSOR SIGNATURE:	
VUT OFFICE USE:	<i>ACCEPTED</i> <input type="checkbox"/> <i>DECLINED</i> <input type="checkbox"/>

# 1. PROJECT PROPOSAL

## 1.1 PROJECT PROPOSAL GUIDELINES

- Students are required to submit a project proposal within the first four weeks following the commencement of this module.
- The proposal must be co-signed by both the assessor and the student to ensure mutual agreement and understanding of the project scope and objectives.
- Projects can be undertaken individually or as part of a team, provided the student is currently involved in the team project. The primary goal is to afford students the opportunity to gain experience with industrial projects.
- The project's focus area will be designated by the employer, encompassing a range of potential topics including but not limited to:

**1. Computer Systems and Hardware Engineering:** Focuses on projects related to the design, development, and testing of computer hardware, including microprocessors, circuit boards, and peripherals. This stream could also cover embedded systems and computer architecture.

**2. Software Development and Engineering:** Encompasses projects involving software design, coding, testing, and maintenance. This stream can be divided into subcategories such as web development, mobile app development, and enterprise software solutions.

**3. Network and Cybersecurity:** Dedicated to the design, implementation, and security of network systems. Projects can range from setting up secure network infrastructures to developing new cybersecurity protocols and measures.

**4. Cloud Computing and Infrastructure:** Involves projects centered on cloud services, virtualization technologies, and the management of cloud-based computing resources. This stream can also explore the optimization of cloud infrastructure for efficiency and scalability.

**5. Internet of Things (IoT) and Smart Technologies:** Covers projects related to the development and integration of IoT devices and systems, including smart home technologies, industrial IoT applications, and wearable devices.

**7. Database Management and Development:** Focuses on projects involving the design, implementation, and optimization of database systems. This can include relational databases, NoSQL databases, and data warehousing.

**8. Operating Systems and Platform Development:** Involves projects related to the development and enhancement of operating systems, device drivers, and system-level software.

**9. Emerging Technologies and Innovation:** A broad category that allows students to explore projects in cutting-edge areas such as augmented reality (AR), virtual reality (VR), blockchain technology, and AI.

By providing these categories, students can choose a path that best matches their interests, career goals, and the technological focus of their workplace. This structured approach also helps companies identify projects that can leverage the students' contributions for tangible outcomes, aligning with their strategic objectives and technological needs.

- Projects may take place in an engineering setting, which typically encompasses servers, desktop computers, industrial computing devices, and systems. This environment may involve working with hardware, operating systems, and proprietary software systems of the employer.
- Students should employ suitable techniques, resources, and contemporary engineering tools to execute a clearly defined engineering project while cognizant of its limitations, boundaries, assumptions, and constraints.
- Effective communication is paramount; students must demonstrate proficiency in articulating project objectives, progress, and outcomes both verbally and in written form, within an engineering framework.

- The program emphasises the importance of independent and lifelong learning, encouraging students to cultivate advanced learning skills for continuous personal and professional development.
- Note that you can't start with a project that has not been approved, otherwise your final submission will not be recognised.

## **1.2 PROJECT PROPOSAL FORMAT**

Refer to appendix B for the proposal format. Your project proposal will become chapter 1 of your final project report, that means your proposal should contain the following sections:

### **1 Background to the Project**

Students are expected to describe in general terms the larger area of the problem being investigated. This will serve as the basis of introducing the problem. It will also be a way to establish a relationship that exists between the problem being investigated and the larger area of concern to people and organizations.

### **2 Statement of the Problem**

The research study is to provide answers /solutions to identified problems. Students should be able to state the problem clearly and convincingly and justify/show the necessity to find the solution to it, as well as the implication of such a problem. If possible, such a problem could be linked to a given theory or fact.

### **3 Main Objective and Specific Objectives of the Project**

The author is expected to narrow the problem or state the problem in specific terms. The purpose of the study is to find a solution to the problem or find relationships that exist between the problem and other problems by breaking the problem into its component parts through exploration or analysis. Three (3) to Four (4) specific statements (objectives) of what the project intends to do to achieve the main objective could be stated.

#### **4. Significance of the Study**

This section provides justification for the study and what will be contributed to knowledge by the study if successfully carried out. It provides the author with the opportunity to justify his/her attempt to solve the problem.

#### **5. Scope of the Study**

Delimitation or scope of the study enables the researcher to circumscribe his research within a manageable limit. It provides the researcher with the opportunity to explain the boundaries of the study and describe the aspects of a general /wide problem area covered as well as what aspects will not be covered.



VAAL UNIVERSITY OF TECHNOLOGY  
FACULTY OF ENGINEERING AND TECHNOLOGY  
WORKPLACE BASED LEARNING (WBL)  
COMPUTER SYSTEMS ENGINEERING



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**PROJECT ASSESSMENT REPORT**  
**EIPRC4A**

**ASSESSOR DECLARATION – ASSESMENT REPORT WBL PROJECT  
(EIPRC4A)**

STUDENT	INITIALS AND SURNAME:	
	VUT - STUDENT NUMBER:	
	ID NUMBER:	
COMPANY:		
TRAINING PERIOD	WBL:	TO <i>START DATE:                      COMPLETION DATE:</i>
ASSESSOR	INITIALS AND SURNAME:	
	CELL OR TELEPHONE NUMBER:	
	E-MAIL:	
	ASSESSMENT	
<p><b>ASSESSOR DECLARATION</b></p> <p>I, the above-mentioned assessor, declare that the above-mentioned student has completed this workplace-based learning module (WBL) of the qualification in the mentioned period under my supervision. The student was found competent in the outcomes as specified in the assessment report.</p> <p><i>SIGNATURE:</i> _____ <i>DATE:</i> _____</p>		
<b>VUT OFFICIAL</b>	<b>FINAL MARK:</b>	
<i>SIGNATURE:</i>		<i>DATE:</i>

**LEFT BLANK ON PURPOSE**



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## **APPENDIX A**

### **RUBRIC FOR FINAL ASSESSMENT OF GA 12**

GRADUATE ATTRIBUTE 12: WORKPLACE PRACTICES

SUBJECT: WORKPLACE-BASED LEARNING

STUDENT NAME: .....

STUDENT NO.: .....

DATE: .....

**GRADUATE ATTRIBUTE 12: WORKPLACE PRACTICES**

<p><b>Learning outcome:</b> Demonstrate an understanding of workplace practices to solve engineering problems consistent with academic learning achieved.</p> <ul style="list-style-type: none"> <li>• The balance of investigation and experiment should be appropriate to the discipline. <b>An investigation or experimental study</b> should be typical of those in which the graduate would participate in an employment situation shortly after graduation.</li> </ul>	
<p><b>Where is the outcome assessed?</b></p>	<p>In the final Workplace project report.</p>
<p><b>How is this outcome assessed?</b></p>	<p>Students must submit a report, validated by a mentor, demonstrating their capability to:</p> <ul style="list-style-type: none"> <li>• Utilize computer engineering principles to develop, construct, and configure systems within the workplace-based learning environment.</li> <li>• Employ computer engineering principles for the design or enhancement of existing systems.</li> <li>• Implement computer engineering principles to innovate or improve processes within the workplace.</li> <li>• Certainly! Here are additional points that build upon the initial requirements, showcasing a comprehensive application of computer engineering principles in a workplace-based learning setting:</li> <li>• Analyse and evaluate the performance of implemented systems, employing computer engineering principles to identify optimization opportunities and implement effective solutions.</li> <li>• Apply critical thinking and problem-solving skills to troubleshoot and resolve technical issues that arise during the development or operation of systems.</li> </ul>

	<ul style="list-style-type: none"> <li>• Collaborate effectively with cross-functional teams, using computer engineering principles to communicate technical concepts clearly and contribute to interdisciplinary projects.</li> <li>• Demonstrate an understanding of industry standards and regulatory requirements relevant to computer engineering, ensuring that all projects comply with these guidelines.</li> <li>• Employ computer engineering principles to assess the security implications of systems and processes, implementing robust security measures and protocols to protect organizational data.</li> <li>• Integrate sustainability considerations into system design and development, applying computer engineering principles to promote environmental responsibility and resource efficiency.</li> </ul>
<p><b>What is satisfactory performance?</b></p>	<p>The student must comply with conducting a proper investigation and experiment to uncover the required information. The student should reflect the following in the report:</p> <ul style="list-style-type: none"> <li>• define the scope, methodology, and literature review,</li> <li>• analyse the results, draw conclusions, provide possible solutions (outcome if experimental),</li> <li>• report on the work in writing, keeping in mind to use appropriate methods/tools.</li> <li>• Include a portion of data/data analysis in the literature review.</li> </ul> <p>This graduate attribute is assessed by a comprehensive four (4) level rubric where a minimum set of outcomes must be met to prove competency. The GA assessment is categorised as follow:</p> <ul style="list-style-type: none"> <li>• <b>Poor</b> - student does not comply at all,</li> </ul>

- **Borderline** - may comply with corrections,
- **Competent** - min to moderate compliance is met,
- **exceed expectation** - max compliance is met.

All objectives must be achieved with at least the foundational level of adherence as specified by the assessment criteria. This involves a detailed evaluation of the necessity for the project. Computer engineering students must comprehend the critical importance of experimental and project-based work, demonstrating proficiency in planning and executing technology-driven projects. In particular, they are expected to:

1. Choose the most appropriate hardware and software tools for conducting research or experimental projects, showcasing the ability to accurately select and utilize the necessary technology with minimal mistakes.
2. Independently set up and conduct experiments or simulations using specified hardware and software, requiring negligible assistance. They demonstrate a significant degree of autonomy in navigating and employing complex computational tools and environments.
3. Analyse, interpret, and draw meaningful insights from data collected during the project. Perform precise calculations or analyses with minor discrepancies.
4. They should also be capable of comparing experimental data with theoretical concepts, acknowledging any discrepancies, measurement inaccuracies, and variables that could influence the outcomes.

	<p>5. Formulate conclusions based on a thorough analysis of all gathered data. The conclusions should be detailed in a coherent paragraph that encapsulates the project's findings, exhibits a logical flow, and suggests avenues for future research or development.</p> <p>6. Compile the project's objectives, methodology, and findings into a well-organized technical report. Although the report might omit a few negligible details, it should largely reflect the attributes of a comprehensive and professional document, including being properly bound.</p>
<p><b>What is the consequence of unsatisfactory performance?</b></p>	<p>Achieving this attribute is a critical requirement for successfully completing Workplace Based Learning. Non-compliance will result in failure, regardless of whether the aggregate score from all summative assessments is a pass. Students who do not satisfy one or more of the criteria will be afforded a second opportunity, within specified deadlines, to fulfil all requirements for the Graduate Attribute (GA). Should a student fail to meet all criteria after this second chance, they will not pass the module, and their record will indicate 'Fail to meet GA 12'.</p>



**RUBRICS FOR PROJECT REPORT**

Note: 10-40% (1-4),

50-70% (5-7),

80-100% = 8-10,

ECSA Graduate Attribute	Candidate's Surname & Initials	Satisfactory to Excellent			Multiplying factor	Max mark
		Not comply				
		(1-4)	(5-7)	(8-10)		
		Demonstrates a minimal level of understanding of the problem, literature review with references (<5), and ability to use data for analysis and interpretation.	Demonstrates an adequate level of understanding of the problem, literature review with references (at least 5), and ability to use data for analysis and interpretation.	Demonstrates a high level of understanding of the problem, literature review with references (>5), and ability to use data for analysis and interpretation.		
	<p><b>Chapter 1</b> How does the candidate logically lead the reader toward the problem to be investigated?</p> <p>Is the problem clearly stated or defined giving the research a central structure?</p>				X1.75	
	<p><b>Chapter 2</b> Does the candidate</p>				X1.75	

	<p>demonstrate a clear understanding of the issues that are at stake?</p> <p>Does he/she know what others have written about this area and field of investigation? (Literature review)</p> <p>Does he/she know what sort of conclusions they have come to?</p> <p>Does he/she know what methods they have used to come to those conclusions?</p>						
<p><b>SUB-TOTAL MARKS</b></p>	<p>Pass ..... or Fail..... (tick)</p>						<p><b>/35</b></p>

	<p><b>Chapter 3</b></p> <p>Does the candidate give a very detailed account of the exact experimental conditions, components, and equipment used to do the experimental research?</p> <p>Would others be able to follow the account and get the same results?</p> <p>Is the application of the process (method) of research to this research project convincingly described, i.e. does the candidate</p>				X1.5	
--	---	--	--	--	------	--

	understand and effectively apply the method?					
	<p><b>Chapter 4</b> Are all the results obtained interpreted by the candidate?</p> <p>How accurate are the results?</p> <p>How much effort was made to validate the accuracy of the results?</p> <p> Does an objective reading of these results lead to potential answers to the</p>				X1.5	

	research question?						
	<p><b>Chapter 4</b></p> <p>Does the candidate deal with the implications of the interpretation of the results?</p> <p>Does the candidate demonstrate what the bearings are that the results have on the field of inquiry?</p> <p>Does the candidate suggest further topics of research for other researchers?</p>					X1.5	

	<p><b>Logical Development:</b></p> <p>Does the candidate demonstrate that he/she has control of the "rhetoric of research" or the process of making an argument and convincing the reader of the results?</p> <p>Does the structure of the document support this?</p>						
<p><b>SUB-TOTAL MARKS</b></p>	<p>Pass ..... or Fail..... (tick)</p>						<p><b>/45</b></p>

	Is the report structured and presented in a quality consistent with best-practice scholarly journal articles?					X1.2		
	Is the presentation clear and professionally laid out? Are the slides and use of media well executed?					X0.8		
	<b>SUB-TOTAL MARKS</b>	Pass ..... or Fail..... (tick)						<b>/20</b>
	<b>OVERALL TOTAL</b> <b>Note: Any failure of a GA caps the overall mark to 45% if the overall mark is equal to or greater than 50%</b>							<b>/100</b>
		NAME		SIGNATURE		DATE		

<b>GA12 Compliant</b>	<b>YES</b>				
		<b>WIL CO-ORDINATOR</b>			
	<b>NO</b>	<b>MODERATOR</b>			







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**APENDIX B**

**EIPRC4A PROJECT REPORT FORMAT**

**FOR WORK PLACED BASED LEARNING (WBL)**

## **PRELIMINARY PAGES**

- **Cover / Title Page**

This page consists of the title of the project which is stated at the upper half of the page. This is to be followed by the author's full name with the surname first and other. Note that when the surname comes first, it is separated from the other names with a comma.

The lower part of the page is to have the statement that reads: 'A project presented to Vaal University of Technology in partial fulfillment of the requirements for the award of the diploma of Electrical Engineering. The student shall indicate at the bottom of the page the month and year the project was completed (e.g., February 2023).

- **Certification Page**

On this page shall be the certification of the project mentor of the originality of the study as a true work carried out by the student. The statements here shall read: This is to certify that this research project titled: "..... ", written by (Student surname and other names) with the student number under my supervision". Followed by the supervisor's name, signature, and date.

- **Dedication Page**

This page provides the author the opportunity to express some words of gratitude to those dear to him/her one way or the other.

- **Acknowledgement Page**

This page provides the author the opportunity to acknowledge the help and contribution of different people who directly or otherwise contributed to the success of the work.

- **Abstract Page**

This page consists of a synopsis of the entire work. It briefly states the problems of the investigation, the purpose of the study, how it was carried out, major findings, and recommendations. This is to be done in about 360 words (this could be done with the aid of computer word count).

- **Table of Content**

This page consists of the list of chapters and sub-units with their respective page numbers as contained in the main body of the work. The pages before the main body of the work are numbered in Roman numerals, while other pages are numbered in Arabic numerals. Other parts of the table of contents are:

- List of Tables to be numbered 1,2,3, 4...N
- List of Figures to be numbered I, II, III ...N

Use Word's table of content feature to insert a TOC that contains hyperlinks to their corresponding section.

- **Formatting**

- The project should follow the following formatting criteria:
- Font: Times New Roman
- Font Size:12
- Line spacing: 1.5
- Headings and sub-headings should follow the correct numbering.

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background to the Project**

Students are expected to describe in general terms the larger area of the problem being investigated. This will serve as the basis of introducing the problem. It will also be a way to establish a relationship that exists between the problem being investigated and the larger area of concern to people and organizations.

### **1.2 Statement of the Problem**

The research study is to provide answers /solutions to identified problems. Students should be able to state the problem clearly and convincingly and justify/show the necessity to find the solution to it, as well as the implication of such a problem. If possible, such a problem could be linked to a given theory or fact.

### **1.3 Main Objective and Specific Objectives of the Project**

The author is expected to narrow the problem or state the problem in specific terms. The purpose of the study is to find a solution to the problem or find relationships that exist between the problem and other problems by breaking the problem into its component parts through exploration or analysis. Three (3) to Four (4) specific statements (objectives) of what the project intends to do to achieve the main objective could be stated.

### **1.4 Significance of the Study**

This section provides justification for the study and what will be contributed to knowledge by the study if successfully carried out. It provides the author with the opportunity to justify his/her attempt to solve the problem.

### **1.5 Scope of the Study**

Delimitation or scope of the study enables the researcher to circumscribe his research within a manageable limit. It provides the researcher with the opportunity to explain the boundaries of the study and describe the aspects of a general /wide problem area covered as well as what aspects will not be covered.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Preamble**

This requires a brief outline of the work in this chapter.

### **2.2 Conceptual framework of the project**

Relevant definitions, meanings, explanations, and clarifications to the concepts being explored in the study should be briefly discussed and linked to the study to provide the right framework for the project.

### **2.3 Theoretical framework of the project**

Relevant theories to the problem being investigated in the study should be briefly discussed and linked to the study to provide the right framework for the study i.e., theories on which the study is anchored. It also provides an avenue to review relevant and known literature on the problem being investigated.

## **CHAPTER THREE: PROJECT METHODOLOGY**

### **3.1 Preamble**

This requires a brief outline of the work in this chapter.

### **3.2 Research Design**

This has to do with the blueprint of the project that points the way to what should be expected. It shows the project design being adopted for the study and why.

### **3.3 Method of Data Analysis**

The method of data analysis should consist of the basic elements of data preparation, tabulation, and analyses. It should contain the breakdown and ordering of the quantitative information gathered through the research.

### **3.4 Limitation of the Methodology**

Relevant observed unrelated circumstances or imperfections encountered in sampling from the design etc. should be stated as limitations to the methodology.

### **3.5 Presentation and Analysis of Data**

Data collected is to be presented and analyzed. Students will have to choose the methods that best suites the data collected. Data could be presented using tables, pie charts, bar charts, histograms etc. Data presented should be accompanied by the interpretation of the associations and relationships among the data groups with the appropriate implication to the study or the unit of study. The summary of the interpretation should provide answers to the research questions.

### **3.6 Discussion of Finding**

Discuss your findings and identify the implications of the study.

## **CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS**

### **4.1 Conclusions**

Conclusions should be drawn from the findings.

### **4.2 Recommendations**

Recommendations should also be based on the conclusions.

### **4.3 Bibliography (Harvard reference style)**

### **4.4. Appendix**



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**APPENDIX C**

Title of the project

Project submitted in partial fulfillment of the requirements for the degree

Diploma: Electrical:

In the Faculty of Engineering and Technology

**Full name**

Student number:

Supervisor:

(Date)



## **Declaration**

I \_\_\_\_\_, declare that this thesis is my original work and that it has not been presented to any other university or institution for similar or any other degree award.

.....

Signature

Date

## Acknowledgement

Name	Affiliation

|

## **Dedication**

## **Abstract**

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# **CHAPTER 1: INTRODUCTION**



## **CHAPTER 2: LITERATURE REVIEW**

## **CHAPTER 3: METHODOLOGY AND DISCUSSION OF RESULTS**

## **CHAPTER 4: CONCLUSION AND RECOMMENDATION**

## REFERENCES

Hozumi, N., Nagae, H., Muramoto, Y., Nagao, M., and HengKyun, X. 2001. Time-lag measurement of void discharges and numerical simulation for clarification of the factor for partial discharge pattern. *Proceedings of International Symposium on Electrical Insulating Materials*, pp. 29 - 32.

Okamoto, T., Kato, T., Yokomizu, Y., Suzuoki, Y., and Tanaka, T. 2001. PD characteristics as a stochastic process and its integral equation under sinusoidal voltage. *In IEEE Transactions on Dielectrics and Electrical Insulation*, vol. 8, no. 1, pp. 82-90.

Chanda, M., and Roy, S.K. 2008. *Industrial Polymers, Specialty Polymers, and Their Applications*, 1st ed.; CRC Press: Boca Raton, FL, USA, 2008.

