International Journal of Research Studies in Education
2026 Volume 15 Number 23, 175-186



General and professional Electrical Engineering (EE) courses as predictors of success in the licensure examination

Del Rosario, Arlyn ✉
Holy Angel University, Philippines (adelrosario@hau.edu.ph)

ISSN: 2243-7703
Online ISSN: 2243-7711

Received: 2 November 2026 **Revised**: 13 November 2026 **Accepted**: 15 November 2026 OPEN ACCESS
Available Online: 16 November 2026 **DOI**: 10.5861/ijrse.2026.26458

Abstract

This study investigated the academic performance, core subject competencies, and licensure examination outcomes of Engineering students at an Autonomous University in Central Luzon to determine key predictors of professional success. Using a descriptive-causal design, academic records of recent graduates (N = 4) across General Mathematics, Engineering Sciences and Allied Subjects, and Professional Subjects were evaluated against their outcomes in the Registered Electrical Engineer Licensure Examination (REELE). Linear regression and correlation analyses revealed that performance in General Mathematics exhibited the strongest positive relationship with overall grade point average and board performance (R = 0.638, R^2 = 0.407, p < .001), followed by Engineering Sciences (R = 0.551, R^2 = 0.303, p < .001) and Professional Subjects (R = 0.387, R^2 = 0.150, p = 0.006). Furthermore, historical performance in the REELE from 2017 to 2022 demonstrated considerable volatility, peaking at a 100% passing rate in September 2018 and declining to 43% in September 2022. Assessment of the September 2022 indicated a licensure examination median score of 67.00 (interquartile range IQR = 11.3), with a 55.1% failure rate, highlighting critical gaps in board preparedness. The findings establish that foundational competencies in Mathematics and Engineering Sciences serve as vital determinants of academic achievement and licensure success. Consequently, institutional strategies must prioritize enhanced diagnostic support, curriculum alignment, and structured review programs to improve student retention and Professional Licensure passing rates.

Keywords: general electrical engineering, professional engineering, predictors, success, board examination

© The Author(s) / Attribution-NonCommercial-NoDerivs CC BY-NC-ND

General and professional Electrical Engineering (EE) courses as predictors of success in the licensure examination

1. Introduction

General and professional courses in EE program play a vital role in the successful performance of those who take the licensure examination for electrical engineers. The sudden drop in the recently concluded September 2022 Registered Electrical Engineer Licensure Examination (REELE) with rating below the national passing is of major concern of one of the autonomous Institution in Central Luzon. Constantly narrow down the gap between the institution passing rate and national passing rate is of major concern of the autonomous institution in Central Luzon. Records on the results on the past five (5) years of licensure examination for EE, shows a down trend in the performance of an autonomous educational institution in Central Luzon based on the board examination ratings of its students. The Professional Regulation Commission (PRC) announced that 2,467 out of 4,914 examinees passed the REELE given by the Board of Electrical Engineers last September 2022 with a national passing rate of 50.20 percent. Last September 2021 the national passing rate is 64.40, September 2019 national passing rate is 67.14, September 2018 national passing rate is 66.75 and September 2017 national passing rate is 62.93.

The evaluating the course program in terms of its general and professional courses is imperative as this may predict the licensure examination ratings. Should this premise be proven, it will create a great impact on the institution's decision making. The capability of an institution to gather information from its previous board examination results would reflect its commitment to provide quality education, enhanced curriculum and to prepare future engineers. With globally competitive skills and knowledge. As each data may be used to enhance further, the development of an institution and drive to develop an up-to-date and globally competitive graduates, industry ready skills and knowledge to its graduates. The general and professional subjects and ratings in EE licensure examination are presented using descriptive statistics such as frequency and percentage. The central tendency and dispersion were presented using median and interquartile range as the distribution of data in all variables were found as not normally distributed with $\rho \leq 0.001$ using Shapiro-Wilk Test. To test the significance of the relationship between the academic performance of the graduates in their general and professional EE subjects with the scores in the September 2022 EE licensure examination, the Spearman's rho test is use. The ρ - value is ≤ 0.05.

The capability of an institution to gather information from its previous board examination results would reflect its commitment to provide quality education, enhanced curriculum and to prepare future engineers, with globally competitive skills and knowledge. The development of an institution and drive to develop an up-to-date and globally competitive graduates, industry ready skills and knowledge to its graduates and constantly narrow down the gap between the institution passing rate and national passing rate.

2. Review of Related Literature

EE in the Philippines - The EE Program in the Philippines is a four years program that focuses on conceptualizing, developing, and designing a safe, economical, and ethical utilization of electrical energy. The program also trains students to effectively develop and test real-life application of electrical circuitry, digital systems, electrical equipment, and machine control.

EE Curriculum - The Philippine Regulatory Commission (PRC) is the licensing and regulatory agency of the National government for the practice of regulated professionals. PRC performs two important functions, which are: 1. to conduct and administer licensure examination to aspiring professionals, and 2. to regulate and supervise the practice of the professions exercised in partnership with forty-six Professional Regulatory Board (PRB) in the field of health, business, education, social sciences, engineering and technology. The PRB govern their respective

professions' practice and ethical standards and accredit the professional organizations and support to national development priorities.

EE Licensure Examination - The School of Engineering and Architecture (SEA) offered Electrical Engineering (EE) Program since September 1969 only school to offer the academic program in the province of Pampanga. Through the continues effort of the University, administrator, faculty and the students as well the EE program was awarded by Commission on Higher Education (CHED) the Center of Development for Region 3. At present, the program holds a Level 2 re-accreditation by Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU) until November 2025. The board examination performance on EE for the past five Academic Years (A.Y.) Years 2017 – 2022 has tremendously declined from above national passing rate to way below the national. With the past five years of licensure examination for EE, there has been a down trend in performance in the board examination ratings of one of the academic institutions in Central Luzon.

Table 1

The Board Examination Performance for the Past Five Years of One of the Autonomous Universities

Year	REE Licensure Examination	Takers Passed	Takers Failed	Percentage Passing
2017	April (45)	39	6	87
	September (22)	19	3	86
2018	April (7)	5	2	71
	September (35)	35	0	100
2019	April (6)	5	1	83
	September (45)	39	6`	87
2021	September (21)	16	5	76
2022	April (23)	19	13	59
	September (51)	22	29	43

Note. REE refers to Registered Electrical Engineer. Data reflect performance across board examination cycles from 2017 to 2022.

The examination is conducted by the Board of Electrical Engineering under the supervision of the PRC. To become a licensed EE, a graduate of EE needs to pass the Electrical Engineering Licensure Examination (EELE). It is scheduled twice a year in the months of April and October. The Licensure Examination for EE consists of three major topics: Mathematics, Engineering Sciences and Allied Subjects, and EE Professional Subjects. Enumerated are the weight of each subject and the subtopics under them.

Table 2

Percentage Weight of Subject in the REELE

Mathematics is 25%	Engineering Sciences and Allied Subjects is 30 %	Professional subjects are 45%
Differential Calculus and Integral Calculus, Differential Equations, Complex Numbers, Probability and Statistics Matrices, Power Series, and Fourier Series, Laplace Transforms.	General Chemistry, College Physics, Computer Fundamentals and Programming, Engineering Materials and Mechanics, Fluid Mechanics, Strength of Materials, Thermodynamics, Electrical Engineering Law, Engineering Economics, Engineering Management Contracts and Specifications, Code of Professional Ethics, Philippine Electrical Code Part 1 and 2	Electric Circuits Electronic, Theory and Circuit Energy Conversion, Power Transmission and Distribution, Instrumentation and Measurement, Circuit and Line Protection, Control System Principles and Communication, Electrical Machines, Electrical Equipment, Components and Devices, Electric Systems, Power Plants, Electronic Power Equipment Illumination, Building Wiring.

Note. This table outlines the subject classification and percentage weights for the licensure examination.

For an examinee to pass the REE licensure examination, he must obtain a General weighted rating of 70%, with no grade lower than 50% in any subject. If the examinee obtains a grade of less than 70%, that examinee will be considered conditional, he or she will retake the examination on the same subject until he or she obtains a grade of 70% or higher. You need to attain a general average of 70 % with no grade below 50% in any subject to pass the EELE. The test for the relationship of academic performance in the General and Professional EE subjects and the licensure examination rating of the EE graduates at Holy Angel University (HAU) is compared to the study entitled *Comparison of Student Achievement with Performance Ratings of Graduates and State Board Examination 24(1) 59–62, 64.* The study indicates how well the learning experience provided by the school prepared the students for first–level positions in nursing. Generally, knowledge is gained through education. Bahian (2020) believed that

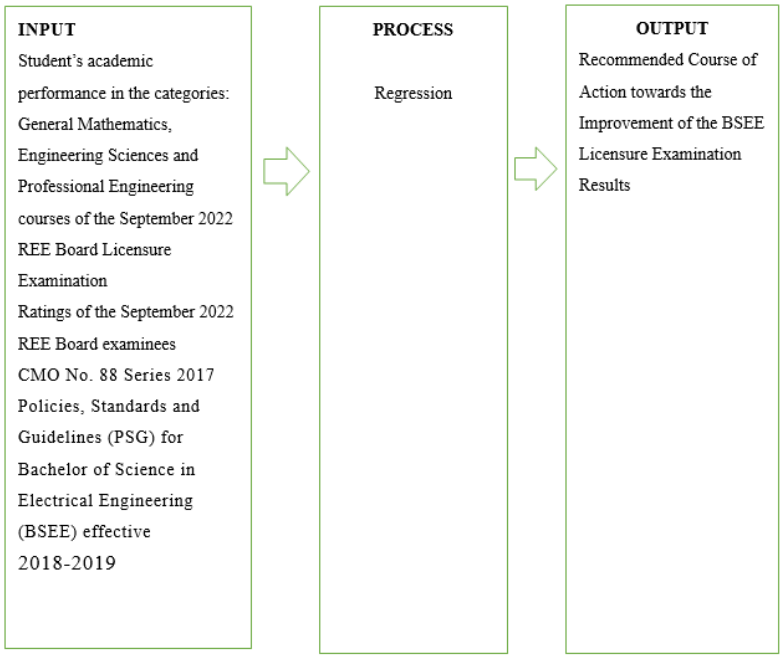
schools are the main sources of knowledge, and majority would approve that learning can be gained within and outside of a school. Virginia Tech. Institute, for many years, helped its senior engineering students in preparing for the Fundamental of Engineering examination. The program begins in 1970's as an unofficial series of review lectures offered by engineering faculty. Later, it became a two credits hour course administered by the Department of Engineering Sciences and Mechanics with modules taught by faculty from many engineering disciplines as well as Mathematics and Chemistry. Historically, Virginia Tech. has both high levels of undergraduate involvement and pass rate over the past decades (Dillard, 2011). The Licensure Examination for Fisheries Technologists (LEFT) of the Western Philippines University (WPU) revealed that graduates LEFT performance was significantly influenced by their scores in the pre and post mock board examinations, employment, the length of time between graduation and examination, number of attempts in taking the board examination, and the number of subject areas passed in the licensure examination. Review class offered by the college significantly improved the scores of students in the exam (Plasus & Diamante, 2020). Far Eastern University rule and admission policy on Bachelor of Science in Accountancy degree, explicitly requires all students who will take the board exam to take comprehensive examination the end of student's final year in school, whereas non passes may take the said exam as many as they want until qualified.

Statement of the Problem - The main objective of this study is to determine the correlation between the academic performance in the General Mathematics, Engineering Sciences and Allied Subjects and Professional Subjects and the Licensure examination for EE. Specifically, the study aims to answer the following:

- How may the academic performance of EE be described in terms of the following subject: General Mathematics, Engineering Sciences and Allied Subjects, and Professional Subject
- Is there a significant relationship between General Mathematics, Engineering Sciences and Allied Subjects and Professional Subject in the EELE?
- What recommendations may be provided in improving the influence of EE courses in the passing rates in the EE licensure examination.

Figure 1

Research Diagram



Note. This research diagram outlines the framework of the study. The input consists of student academic performance in General Mathematics, Engineering Sciences, and Professional Engineering courses from the September 2022 REE Board Licensure Examination, the ratings of the examinees, and CMO No. 88 Series 2017 Policies, Standards and Guidelines (PSG) for Bachelor of Science in Electrical Engineering (BSEE) effective 2018–2019. The process involves regression, which leads to the output of a recommended course of action toward improving the BSEE Licensure Examination results.

Alternative Hypothesis - There is no significant relationship between the academic performance in the general and professional EE subjects and the licensure examination rating of the EE graduates.

3. Methodology

Research Design - A descriptive-causal research design will be used in this research for the purpose of analyzing the existing records relevant to the Grade Point Average (GPA) in the general and professional EE subjects and EE licensure rating of the research locale for the licensure examination last September 2022. The descriptive - causal research design is a research design determines the comparison between outcomes after and action or event has taken place (Salkind,2010). To assure adherence to the regression assumption a test for independence using VIF and test of equality using heteroskedasticity will be used.

Sources of Data - The data for this research were gathered from official institutional records covering graduating students and Registered Electrical Engineer (REE) licensure examination from 2017 through 2022. Academic records, specifically the final Grade Points Average (GPAs) in General and Professional Electrical Engineering (EE) subjects, were obtained from the Office of the Registrar upon clearance and approval from the Data Privacy Officer. Board examination ratings of the EE licensure examinees were acquired with the formal approval of the Dean of the School of Engineering and Architecture. To evaluate the correlation between the student's curriculum year GPAs and their licensure examination results, the researcher collected, tallied, and standardized all board ratings using University's Standard Transmutation table.

Graduates of the Bachelor of Science in Electrical Engineering (BSEE) program under the revised curriculum and who officially took and completed the September 2022 Registered Electrical Engineering (REE) Licensure Examination. Excluded in this study are the graduates under the old curriculum. Graduates who did not take the September 2022 REELE. Graduate students with incomplete or missing final grades in any of the required General, Engineering Sciences, or Professional EE course categories. April REE licensure examination has a passing rate of 87.0%, September 2017 REE licensure which 86.0% passing rate; April 2018 REE licensure examination is which 71.0%, September 2018 REE licensure examination which is 100.0% passing rate; April 2019 REE licensure examination has 83.0% passing, August 2019 REE licensure examination to which 87.0% passed; September 2021 REE licensure examination to which 76.0% passed; April 2022 REE which is 59.0% passing, and September 2022 REE licensure examination which has 43.0% passing.

Research Instruments - The researcher will gather the data and tally the collected final grades of the students in the General and Professional subjects. The GPA is the final grade per General and Professional subjects, basing on the grading system used by some universities, where 1.0 is the highest and 5.0 is the lowest. The same scale will be used to describe the academic performance of the General and Professional EE subject of 2022 graduates. The Board examination ratings of the EELE of September 2022 will be obtained with the approval of the Dean of the School of Engineering and Architecture (SEA). To determine the correlation of the GPA of the students in the specified curriculum year, the board examination rating was transmuted to the standard transmutation table of the university. Generating the tally sheets used in summarizing the correlation of the GPAs and transmuted licensure examination ratings.

Operational Definition and Computation of Cluster GPAs - To evaluate academic performance across different curriculum areas, the final grades of the students were grouped into three distinct composite clusters. Rather than using a single cumulative GPA, a separate cluster Grade Point Average (GPAs) were computed using a unit-weighted formula.

$$\text{Cluster GPA} = \Sigma(\text{Grade} \times \text{Units}) / \Sigma \text{ Units}$$

Where Grade represents the final numerical grade in each course (based on the university grading scale where 1.0 is the highest and 5.0 is the failing mark) and Units corresponds to the official credit units assigned to that course under CMO No.88 Series of 2017. The three computed variables are defined as follows: General

Mathematics GPA_{GM}: Computed from final grade in Differential Calculus, Integral Calculus, Differential Equations, Advance Mathematics, Numerical Methods, and Probability and Statistics. Engineering Sciences and Allied Subjects GPA_{ES}: Computed from final grades in General Chemistry, College Physics, Engineering Mathematics, Fluid Mechanics, Fundamentals of Deformable Bodies, Thermodynamics, Materials Science and Engineering, and Engineering Economics. Professional Subjects GPA_{PROF}; Computed from final grades in Electric Circuit (1 & 2), Electronics, Theory and Circuit Energy Conversion, Power Transmission and Distribution, Instrumentation and Measurement, Control System Principles, Electrical Machines, Electrical Equipment, Power plants, and Illumination/Building Wiring.

The Professional Regulation Commission (PRC) reports Registered electrical Engineer (REE) licensure examination results as percentage scores ranging from 0% to 100%. In accordance with republic Act No. 7920, a candidate successfully passes the licensure examination by attaining a General Weighted Average (GWA) of at least 70% with no individual grade lower than 50%. To ensure institutional consistency with the academic performance metrics, the raw percentage ratings issued by the PRC were converted using University's Standard Transmutation Table. This transmutation maps the percentage-based board ratings into the institution's equivalent performance and descriptive ratings (ranging from Outstanding and Superior down to Satisfactory, Fair and Failed), enabling standardized statistical comparison against the graduates' curriculum Grade Point Averages (GPAs)

Data Collection - To obtain the grades of the EE students for the curriculum year 2022, scores are retrieved the registrar's office with the approval of the SEA dean, Head of the University Registrar and the Data Privacy Officer with names of students being anonymous. After gathering the grades of the graduates of batch 2022, the researcher tallies the grades then result will be interpreted and analyzed.

Data Analysis - The data was interpreted using Linear Regression. The statistical tool named Statistical Package for Social Sciences (SPSS) version 26 and Microsoft Excel is used in this study. The general and professional subjects and ratings of the EE licensure examination were presented using descriptive statistics like frequency and percentage. The central tendency and dispersion were presented using median and interquartile range as the distribution of data in all variables were found as not normally distributed with $\rho \leq 0.001$ using Shapiro-Wilk Test. To test the significance of the relationship between the academic performance of the graduates in their general and professional EE subjects with the scores in the September 2022 EE licensure examination, the Spearman's rho test was used. The ρ - value ≤ 0.05. The strength of correlation was utilized to interpret the obtained correlation coefficient value. Although descriptive summaries utilized medians and interquartile ranges due to the non-normal distribution of raw academic grades, parametric regression models and Pearson correlation coefficients were normal P-P plots, satisfying the assumptions required for linear regression analysis.

Ethical Considerations - The paper shall be subjected to the HAU Institutional Review Board (IRB)'s evaluation and approval. A letter seeking permission from the HAU Data Privacy Office, SEA Dean, University Registrar and EE Coordinator will be sent to ensure that all data are kept confidential. Individual names and contacts will not be mentioned in the research report. Names of students shall be kept anonymous. Gathered data and results will be temporarily stored in a computer with encrypted password and hard files for three (3) years before complete deletion and shredding. The data and results gathered are for research purposes only.

4. Results and discussions

To establish the predictive utility of undergraduate performance on licensure success, all regression models in this study shared consistent structural definition: the dependent variable (Y) was uniformly operationalized as student's overall rating in the September 2022 registered Electrical Engineering (REE) Licensure examination (transmuted via university scale), while dependent variable (X) comprised the respective unit-weighted academic cluster GPAs (GPA_{GM}, GPA_{ES}, GPA_{PROF}).

4.1 Academic Performance and Licensure Ratings

Table 3 shows the academic performance and licensure examination ratings of the EE graduates who took the September 2022 EELE. Out of 49 examinees (N=49) the overall rating in the board examination has a median of 69.0 and interquartile of ±11.3, showing dispersion from 49.1 to 86.8 (describing performance from "failed" to "superior"). Most examinees obtained a rating of "failed" (27 or 55.1%), while 22 examinees (44.9%) obtained a passing rating of 70% or higher. In accordance with republic Act No. 7920, for examinees to pass REE licensure examination, a candidate must obtain a general weighted average of at least 70% with no grade lower than 50% in any subject. Most examinees obtained a rating of "failed" (27 or 55.1), followed by "fairly" (9 or 18.4%) and "satisfactory" (5 or 10.2%). Overall, the board examination ratings had a median of 67.00 and an interquartile range of ± 11.3, reflecting scores ranging from 49.1$ to 86.8 (describing performance from "failed" to "superior").

Table 3

Licensure Examination Ratings of the EE Graduates who took the September 2022

	Licensure Examination	
	f	%
Outstanding		
Excellent		
Superior	1	2.0
Very Good	1	2.0
Good		
Satisfactory	5	10.2
Fairly Satisfactory	4	8.2
Fairly	9	18.4
Passed	2	4.1
Failed	27	55.1
Total	49	100.0
Central and Dispersion	Median	IQR
	67.00	± 11.3

Note. Data illustrate the performance distribution in the EE Licensure Examination. Three students from the old curriculum were not considered.

4.2 Regression Analysis: Predicting Board Ratings from Cluster GPAs

Table 4 presents the linear regression results examining the predictive relationship between the student's GPAs and their September 2022 REE Board Examination ratings. Each row represents a separate simple linear regression model. General Mathematics **(**GPA_{GM}**):** R = .638, R^2 = .407, F = 32.211, p < .001. General Mathematics performance accounts for approximately 40.7% of the variance in licensure examination performance. Engineering Sciences and Allied Subjects **(**GPA_{ES}**):** R = .551, R^2= .303, F = 20.456, p < .001. Engineering sciences performance accounts for 30.3% of the variance. Professional Subjects **(**GPA_{PROF}**):** R = .387, R^2 = .150, F = 8.284, p = .006. Professional subjects account for approximately 15.0% of the variance in licensure examination performance.

Table 4

Linear Regression Models Predicting September 2022 REE Board Examination Ratings from Cluster GPAs

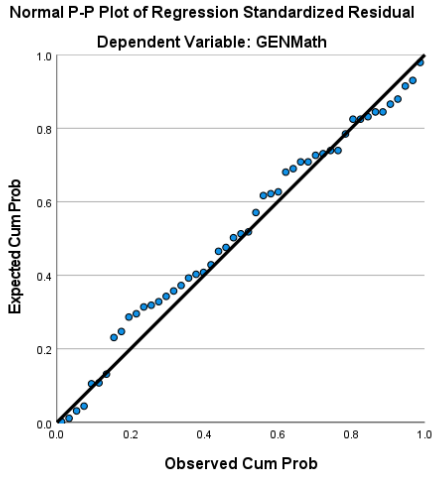
Subjects	R	R Square	F	Sig
General Mathematics and GPA	.638	.407	32.211	<.001
Engineering Sciences and GPA	.551	.303	20.456	<.001
Professional Subjects and GPA	.387	.150	8.284	.006

Note. Data illustrate the regression relationship between academic performance variables and GPA outcomes.

Furthermore, the normal p-p plots of regression standardized residuals (see figures 2 to 4 below). The figures shows that the data points closely follow the diagonal reference line, confirming that the residuals conform well to the normal distribution assumption required for linear regression analysis. This may indicate that the EE examinees of September 2022 who performed well in their academic subjects are likely to perform well in the licensure examination.

Figure 2

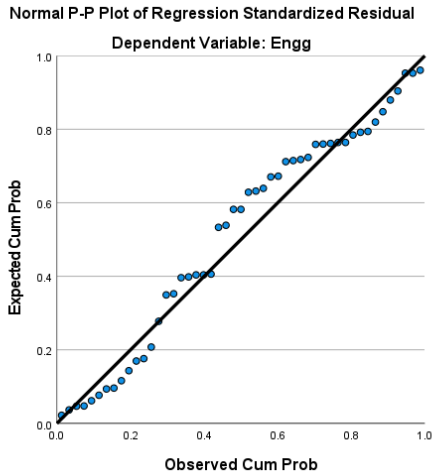
General Mathematics and GPA



Note. Normal P-P plot of regression standardized residuals for the dependent variable General Mathematics (GenMath). The data points closely follow the diagonal line, indicating that the residuals conform reasonably well to a normal distribution assumption.

Figure 3

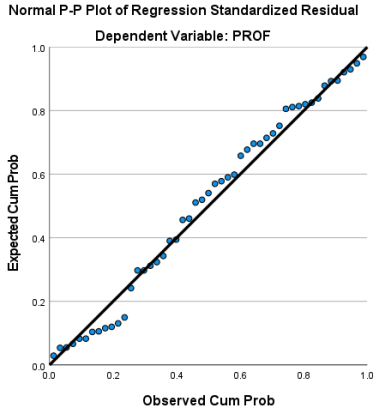
Engineering Sciences and GPA2



Note. Normal P-P plot of regression standardized residuals for the dependent variable Engineering Sciences (Eng'g.). The data points follow the diagonal reference line closely, demonstrating that the assumption of normality for the residuals is met.

Figure 4

Professional Subjects and GPA3



Note. Normal P-P plot of regression standardized residuals for the dependent variable Professional Engineering courses (Prof.). The data points closely follow the diagonal reference line, indicating that the residuals conform to the assumption of normality.

4.3 Correlation Analysis: Relationships Among Subjects

To further evaluate the interrelationships among the curriculum areas and board performance, Pearson's r and Spearman's rho coefficients were computed, as presented in Table 5. The results indicate significant positive relationships across all subject clusters and board outcomes ($p < .001$), demonstrating strong alignment between foundational mathematics, engineering sciences, and professional courses.

Table 5

Significant Relationship between Mathematics, Engineering Sciences, and Allied Subjects and Professional Subjects in the EELE

Subjects	Pearson's r	P-Value	Spearman's Rho	P-Value
General Mathematics and GPA_{GM}	0.638	<.001	0.638	<.001
General Mathematics and Engineering Sciences	0.639	<.001	0.734	<.001
General Mathematics and Professional Subjects	0.76	<.001	0.759	<.001
Engineering Sciences and GPA_{ES}	0.551	<.001	0.597	<.001
Engineering Sciences and Professional Subjects	0.753	<.001	0.756	<.001
Professional Subjects and GPA_{PROF}	0.387	<.001	0.507	<.001

Note. Results of Pearson's correlation coefficient (*r*) and Spearman's rank-order correlation coefficient (Spearman's *rho*) tests examining relationships among General Mathematics, Engineering Sciences, Professional Subjects, and GPA variables $p < .001$ for all presented pairs.
Note. Regression statistics summary for the relationship between General Mathematics and GPA (N = 49). Multiple R = 0.64, R^2 = 0.41, Adjusted R^2 = 0.39, and Standard Error = 5.39.

Table 6

Linear Regression Model Predicting September 2022 REE Board Examination Ratings from General Mathematics GPAGM

	Regression Statistics
Multiple R	0.637689951
R Square	0.406648473
Adjusted R Square	0.394023973
Standard Error	5.388491072
Observations	49

Note. Regression statistics summary showing model performance. Multiple R = 0.64, R^2= 0.41, Adjusted R^2= 0.39, and Standard Error = 5.34.

Table 6 shows the regression analysis for General Mathematics (GPA_{GM}) gives a significant positive relationship with board examination performance (R= 0.638, R Squared = 0.407, F = 32.211, p <.001). The coefficient of determination (R Squared = 0.407) indicate a large effect size, demonstrating that General Mathematics performance accounts for 40.7% of the variance in the licensure examination ratings.

Table 7

Linear Regression Model Predicting September 2022 REE Board Examination Ratings from Engineering Sciences GPA_{ES}

Regression Statistics	
Multiple R	0.550677089
R Square	0.303245256
Adjusted R Square	0.288420687
Standard Error	8.454753788
Observations	49

Note. Regression statistics summary showing model performance. Multiple R = 0.55, R^2= 0.30, Adjusted R^2= 0.29, and Standard Error = 8.45.

Table 7 shows the regression analysis for Engineering Sciences and Allied Subjects (GPA_{ES}) gives a significant positive relationship with board examination performance (R= 0.551, R Squared = 0.303, F = 20.456, p <.001). The coefficient of determination (R Squared = 0.303) indicate a large effect size, demonstrating that Engineering Sciences and Allied Subjects performance accounts for 30.3% of the variance in the licensure examination ratings.

Table 8 shows the regression analysis for Professional Subjects (GPA_{ROF}) gives a significant positive relationship with board examination performance (R= 0.387, R Squared = 0.150, F = 8.284, p =.006). The

coefficient of determination (R Squared = 0.407) indicate a large effect size, demonstrating that Professional Subjects performance accounts for 15.0% of the variance in the licensure examination ratings.

Table 8

Linear Regression Model Predicting September 2022 REE Board Examination Ratings from Professional Subjects GPA_{PROF}

Regression Statistics	
Multiple R	0.387106519
R Square	0.149851457
Adjusted R Square	0.13176319
Standard Error	10.52772942
Observations	49

Note. Regression statistics summary showing model performance (N = 49). Multiple R =0 .39, R^2 = 0.15, Adjusted R^2 = 0.13, and Standard Error = 10.53.

Academic Performance of EE Graduates - The main objective of this study is to determine the correlation of general and professional courses in the EE program of the research locale in successfully predicting the passing scores in the EELE. Based on the data it can be seen that in the General Mathematics Subjects, the graduates performed "satisfactory" and "fairly satisfactory", in Engineering Sciences and Allied Subjects the students performed "very good" to "satisfactory" and for Professional Subjects the graduates performed "superior "and "very good". Only one or 2% performed outstanding in the Professional Subjects. Based on the results of the analysis for the ratings of the licensure examination of the EE graduates who took the 2022 licensure examination, most of the examinees obtained a rating of "failed" which was followed by "fairly" and "satisfactory". Furthermore, most of the ratings have "failed" rating in the licensure examination, which means a higher percentage of examinees did not reach the minimum passing rate of 70% than those who have obtained passing rate and most likely to fail the licensure examination. The overall rating of the graduates in the board examination a description of "failed" to "superior."

Test of Relations between the Academic Performance in the General Mathematics Subjects, Engineering Sciences and Allied Subjects and Professional Subjects and the Licensure Examination Rating of EE - The result using R, R^2 and Sig. test in General Mathematics, Engineering Sciences and Professional Subjects and GPA. Based on the R, R^2 and Sig. test values, the academic performance (GPA) of EE is very much related to the result of their performance in EELE, which means of higher percentage of examinees did not reach the minimum passing rate than those who have obtained passing rate.

Significant Relationship between Mathematics, Engineering Sciences and Allied Subjects, and Professional Subjects in the EELE - To test the significance of the relationship between the academic performance of the graduates in their general and professional EE subjects with the scores in the September 2022 EE licensure examination, the Spearman's rho test was used. The ρ - value ≤ 0.5. The strength of correlation was utilized to interpret the obtained correlation coefficient value. The level of significance of the General Mathematics, Allied Sciences and Professional EE subject with p - value < 0.001 which means that based on both the Pearson's R and Spearman's Rho result with their corresponding p-value, it implies that there is a significant relationship of the General Mathematics, Engineering Sciences, Allied subjects, and Professional subjects to the EELE.

5. Conclusion and recommendations

Even though academic performance plays a crucial role in the performance of the licensure examination as the result of this study. Other studies on the other aspect like the coming of the pandemic which prolongs the graduates from taking the licensure examination, the role of online instructions during COVID-19, faculty qualifications on online delivery of instructions and the On-the -Job training performance need to be made to determine the role in the licensure examination.

Professional Subjects contain a major significance with 61.29 percent relation to the academic performance, Engineering Sciences and Allied Mathematics ranked second with 44.93 percent relation with the academic

performance and the General Mathematics Subjects with 40.66 percent relation with the academic performance. This implies that Professional Subjects should be given major intervention to improve on the licensure examination performance of EE students. According to Pangngay et al, 2023 in his study entitled "Academic Predictors of Performance in the Board Licensure Examination for Psychometrician" (BLEP) that the general academic performance are predictors of BLEP performance. Pangngay,2023 concluded that well undergraduate academic performance heads to better BLEP performance.

The relationship of General Mathematics to GPA is 0.6377, this implies that 40.66 percent of the GPA is related to the General Mathematics scores, while the relationship of Engineering Sciences and Allied Subjects to GPA is 0.5507, this implies that 44.93 percent of the GPA is related to the Engineering Sciences and Allied Subjects scores, the relationship of Professional Subjects to GPA is 0.3871, this implies that 61.29 percent of GPA is related to the Professional Subjects scores.

In Figures 2 to 4, the data points are mainly distributed along a single direction, which concentrates most of the variability. Strong collinearity can be observed in the said figures. This strong collinearity clearly defines students' board examination performance. It appears that academic performance predicts board examination results. Examinees of September 2022 EELE have been found to have poor academic performance, corollary to this, the university's board examination results in the given year were lower than in the previous years. These results are indicative of the importance of students' academic performance as a predictor of success in the licensure examination. This makes sense as the skills that the graduates use in answering board examination questions are the same skills that are covered in their various academic subjects. Their level of mastery and facility of such skills would clearly give them an edge in passing the licensure examination (Pangngay,2023).

The following are the recommendations based on the findings of this study to continue and improve the quality of performance of the future EE examinees.

- Enhance EE curriculum and instruction in respond to this study. Focusing on the Professional Courses.
- Upgrade the passing grade of each subject in the Professional Courses and offer remediation programs for students who do not meet the passing rate.
- Conduct strategic planning with the Electrical Engineering (EE) Department on the improvement of academic performance of EE students.
- Propose an in-house review for graduating students and perform close monitoring of graduates during the review period.
- Conduct a mock board examination and perform close monitoring to graduates who do not pass the mock examination.
- 6.A similar study should be proposed which includes the significance of mock board exams in the EELE performance.
- 7.A similar study should be conducted using descriptive – causal research design.
- 8.A similar study should be conducted which include the effect of remote learning during COVID-19 on the academic performance of students.

AI Use Disclosure. I used Gemini [Google, November 2026 version] for improving table in APA 7 format, editing, idea generation, codes suggestions and improving clarity and sentence flow throughout the manuscript. All outputs were reviewed, verified, and edited by the author, including fact-checking sources, validating code/results. No confidential or personally identifiable data were entered into AI tools. The author takes full responsibility for the content.

6. References

Bahian, M. E. V., Bertulfo, E. B., & Pulma, D. B. (2020). A tracer study of Eastern Visayas State University-Ormoc Campus graduates. *Aloha International Journal of Multidisciplinary Advancement (AIJMU)*, 2(8), 175–183. https://doi.org/10.33846/aijmu20801

Brandt, E. M., Hastie, B., & Schumann, D. (1966). Predicting success on state board examination: Relationships between course grades, selected test scores, and state board examination results. *Nursing Research*, 15, 62-69.

Commission on Higher Education (CHED) Memorandum No. 88 Series of 2017. Policies, Standards, and Guidelines for Bachelor of Science in Electrical Engineering (BSEE), effective 2018–2019.

Commission on Higher Education (CHED). (2017). CHED MEMORANDUM NO. 88 Series of 2017, section 10. Curriculum for Electrical Engineering.

Dillard, D. A., Nipper, M. D., Case, S. W., & Kornhauser, A. A. (2011). *Preparation for the fundamentals of engineering examination at Virginia Tech*.

Maaliw, R. R. (2021). Early prediction of electronics engineering licensure examination performance using random forest. *2021 IEEE World AI IoT Congress (AIIoT)*, 0041-0047.

Markham, E. W. (2020). Anesthesiology resident performance on the US medical licensing examination predicts success on the American Board of Anesthesiology BASIC staged examination: An observational study.

Plasus & Diamante. (2020). Determinants of performance in the licensure examination for fisheries technologists of Western Philippines University Bachelor of Science in Fisheries graduates.

Pangngay, M., et al. (2023). Academic predictors of performance in the board licensure examination for psychometrician. *Philippine Social Science Journal*, 1-7. https://api.semanticscholar.org/CorpusID:258534306

Poso, F. D., & Jesus, K. L. (2020). Levenberg-Marquardt algorithm based neural network model for predicting licensure examination performance of civil engineering students.

Raborn, L. N., & Janis, J. E. (2022). Prediction accuracy and reliability of a decision tree machine learning model to predict success on the American Board of Surgery certification examination. *The Journal of Surgical Research*, 274, 31-45. https://doi.org/10.1016/j.jss.2021.11.019

Salkind, N. J. (Ed.). (2010). *Encyclopedia of research design* (Vol. 1). Sage.

Tarun, I. M. (2017). Prediction models for licensure examination performance using data mining classifiers for online test and decision support system.

Yocom, C. J., & Scherubel, J. C. (1985). Selected pre-admission and academic correlates of succession state board examinations. *The Journal of Nursing Education*, 24(6), 244-249.