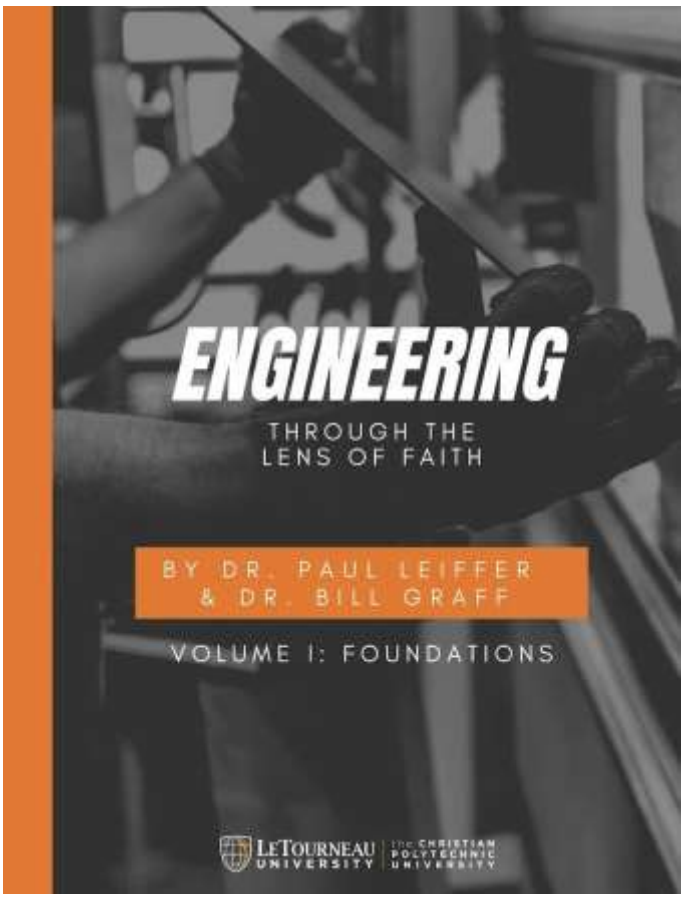
STUDY GUIDE

for

ENGINEERING THROUGH THE LENS OF FAITH

VOLUME 1: FOUNDATIONS

By Paul R. Leiffer and R. William Graff



Background:

The following book grew out of a series of classroom devotionals presented at LeTourneau University, coupled with various workshop and seminar presentations and conference papers.

Volume One deals with foundations: faith, truth, vocation, science, mathematics.
Volume Two deals with applications: ethics, technology, workplace, and missions.

It is the sincere hope of the authors that this book will strengthen your walk with Jesus and help you to connect your faith with your vocation.

Engineering Through the Lens of Faith, along with all the appendices, can be downloaded at no cost from this site:

https://www.letu.edu/alumni/engineerlensfaith.html

Update:

Since the book website was first established, Bill Graff has gone to Heaven and Paul Leiffer has retired.

Acknowledgements:

Our special thanks to:

Our wives, Jani and Igglis, for reading and giving feedback on the manuscript;

Howard Henry for formatting and editing the chapters;

Alumni readers of the manuscript;

Daniel Ostendorff and the LeTourneau Alumni office for arranging online publication of the book;

Faculty members Norm Reese, Hoo Kim, and Craig Olson for continuous encouragement of the project.

Wayne Helmer for help with the refection/discussion questions.

Chapter One

Introduction

Summary-

Chapter One introduces Paul and Bill and the quest to integrate faith and engineering.

Major sections:

- Why this book?
- Paul's Story
- Bill's Story
- Engineering and Faith
- Engineering helps shape my view of God

Appendices available:

1A Dr. Bill Graff (1938-2022)

1B First Stab at a Theology of Engineering

Chapter One

Introduction

Questions for Reflection and Discussion

1. How would you summarize your story (your life) in a few minutes?
2. What part has God played in your life story?
3. If you are an engineer, when (and how) did you know you wanted to be an engineer?
4. Can you identify with Paul's story? With Bill's story? How?
5. How do you see the intersection of Christian faith and engineering? Nonexistent? Impossible? An exciting concept?
6. Have you thought much about an overlap between faith and engineering? How would you describe the overlap?
7. In the section "Engineering Helps Shape My View of God" which of the statements resonate with you? Why?
8. "In Gen. 1:28 God gives to Adam, and thus to mankind, the earliest command of Scripture: to multiply the human race and to subdue the earth, to 'have dominion' over the earth." How can we "have dominion" and yet not abuse His creation?
9. "While God cares supremely about my soul He also cares about computers, airplanes, and my occupation." How does this statement affect your approach to your engineering education and engineering career?

Chapter Two

Engineering

Summary-

Chapter Two looks at the field of engineering, its working definition, history, and accomplishments.

Major sections:

- Engineering differs from science
- Roots of engineering
- Modern engineering
- Philosophy of engineering

Appendices available-

2A Highlights in the History of Engineering

2B Engineers in the Public Eye

2C What Fuzzies Could Learn from Techies

2D The Engineering method

Chapter Two

Engineering

Questions for Reflection and Discussion

1. How would you define engineering?
2. How does engineering differ from science?
3. What influenced you to become an engineer (or, on the other hand, not to become an engineer)?
4. In addition to those listed, what other achievements are linked to engineering?
5. What engineering invention is most special to you? Why?
6. In your experience, how have non-engineers viewed engineers? How would you like to be seen?
7. What is your favorite stereotype of engineers?
8. "It is our contention that many philosophical issues have basically satisfying theological answers, if we accept the reality of the God of the Bible." When was the last time that you considered that this statement was true? Can you think of a "philosophical issue" that you might have dealt with?
9. Consider the final definition of engineering given in the text: "Engineering is the activity of developing technical solutions to meet the needs of humans (made in the image of God) using mathematics, science, and available resources to the glory of God." Can you think of one engineering design that fulfills this definition and one invention that does not fulfill this definition?
10. How do you understand engineering as "a social activity"?
11. Where do you see engineering going in the next fifty years?
12. How would you begin to articulate a theology of engineering?

Chapter Three

Faith

Summary-

Chapter Three looks at the definition of faith, Biblical faith, and the issue of faith and reason.

Major sections:

- Two definitions of faith
- Faith and evidence
- Faith lived out
- Faith and evidence in the Bible
- Faith and reason

Appendices available-

3A Faith and Reason

3B How does one become a Christian?

Chapter Three

Faith

Questions for Reflection and Discussion

1. In your experience, how do your friends and associates primarily define faith?
2. How would you define faith?
3. How has your life and the life of your friends been influenced by the two different definitions of faith?
4. Has your concept of faith changed at all after reading the section “What is Faith?”?
5. Why would our understanding of faith make a difference?
6. What is the difference between “objective faith” and “subjective faith”? What examples do you see of each?
7. Where are you exercising faith in your daily life, apart from “religious” faith?
8. Where might practicing engineers use faith?
9. What position do you hold regarding faith, learning, and reason?
10. Why do the authors claim that Biblical faith is “reasonable faith”?
11. What evidence would you point to in claiming that the Christian message is true?
12. Do you identify with any of the faith heroes in Hebrews 11? Why?
13. Can you think of others in the Bible who exercised faith based on some evidence?
14. Other than the Bible, what else encourages you in your faith?
15. What do you do when you feel doubts?
16. How have you dealt with faith-reason issues?

Chapter Four

Christian Truth

Summary-

Chapter Four presents some key foundations of the Christian faith as explained by engineers.

Major sections:

- God as Father, Son, and Holy Spirit
- The Good-Bad curve
- Salvation
- Grand themes in Scripture
- Human flourishing

Appendices available-

4A More on Creation and Fall

4B Dominion and Common Grace

4C More on Sin

4D Legalism

Chapter Four

Christian Truth

Questions for Reflection and Discussion

1. How has your understanding of God changed/developed over the years?
2. How would you describe your own spiritual journey and your relationship with God?
3. How would you define God, Jesus, sin, grace, and salvation to someone with no background knowledge of the Bible?
4. What key Bible verses define who God is?
5. How would you define/explain God as Trinity?
6. What questions does the Good-Bad curve prompt for you?
7. What sketches or stories might help explain salvation to someone?
8. How-specifically- do people miss the Gospel?
9. How has God's grace been shown to you in the past week? Month? Year?
10. What do you see as specific benefits of a Creation ordained by God (as opposed to random development)?
11. Where do you see specific effects of the Fall in everyday life?
12. How do you understand "common grace" versus "special grace"?
13. Whelchel writes, "The Biblical metanarrative makes a comprehensive claim on all humanity, calling each one of us to find our place in His story." What is your part in His story?
14. How can you glorify God in your engineering education, or in your engineering profession?
15. How might the concept of "human flourishing" be expanded?
16. How else might we define/explain "shalom"? How can we encourage and establish shalom in our daily lives?
17. How can a believer, especially an engineer, extend shalom to the world?
18. What things can become idols in your life?
19. How might an engineer who designs a new photovoltaic solar cell with a 60 % efficiency make this his/her "idol"?

Chapter Five

Christian Living

Summary-

Chapter Five focuses on key aspects of Christian living, along with practical suggestions.

Major sections:

- Goals
- Bible study
- Prayer
- Worship
- Fellowship
- Evangelism
- Guidance
- Keeping from sin

Appendices available-

5A Thoughts on Christian Living

5B The Chicken Wire Diagram

5C Be Weird but not Crazy

5D The Fruit of the Spirit

Chapter Five

Christian Living

Questions for Reflection and Discussion

1. What do you find to be the most challenging part of Christian living?
2. What are your own goals for personal discipleship this week? This month? This year?
3. What has helped you most with your Bible study?
4. What has helped you most with your prayer life?
5. What kind of prayer list do you use? Who do you pray for daily?
6. What do you need prayer for today?
7. How can believers mess up the presentation of the Gospel?
8. Where do you see true Christian love manifested in your Christian community?
9. Who do you encourage and share your deep needs with? To whom are you accountable?
10. What has helped you to discern God's guidance for your life?
11. What has helped you to keep from sin?
12. What kind of personal sin do you struggle with? Who have you shared it with?

Chapter Six

Worldviews

Summary-

Chapter Six examines definitions and categories of worldviews, focusing on naturalism, pantheism, and theism.

Major sections:

- Elements of a worldview
- Basic worldview categories
- Christian worldview
- Discovering and testing a worldview
- Philosophical background

Appendices available-

6A Worldview Categories

6B Naturalism

6C Modernism and Postmodernism

Chapter Six

Worldviews

Questions for Reflection and Discussion

1. How would you describe the concept of worldview?
2. How would you explain to a college student that his/her worldview is important to them and shapes their thinking in many areas?
3. If a worldview is one's mental picture of the world, how would you define your own worldview?
4. What is your conception of: The origin of human beings? The most dependable source of truth? The goal of human life? The source and validity of ethics?
5. What do you see as the prevailing worldview among your colleagues?
6. What kinds of interesting worldview discussions have you had at school or work?
7. Do you see theism as compatible with science? With ethics?
8. How would naturalism deal with science? With ethics?
9. How would pantheism deal with science? With ethics?
10. In what worldview category would you place the movie *Avatar*? Why? Why is a movie like this so appealing?

Chapter Seven

Evidence

Summary-

Chapter seven tackles the issue of evidence pointing to the validity of the Christian message.

Major sections:

- Theology graphs
- Historical evidence
- Archaeology
- Philosophical evidence
- Scientific evidence
- When the curve turned around

Appendices available-

7A What is Truth?

7B The Feasts of Israel

7C Animals as Apologetic

7D What about Pain and Suffering?

Chapter Seven

Evidence

Questions for Reflection and Discussion

1. If someone asked you to explain "the reason for your hope," where would you begin?
2. What would a sketch or timeline of your spiritual journey look like? What are the main events in your life with God?
3. Do you agree that Biblical faith is trust based on evidence?
4. What are the biggest obstacles to faith in your life or in the life of your friends?
5. What do you see as the most compelling piece of evidence for the truth of the Christian message?
6. What kinds of evidence are generally ignored?
7. How do you see matters of ethics/morals handled in the media and in society at large?
8. What questions would you ask to generate a meaningful exploration of Christian evidences?
9. What (specific) miracles have you experienced in the last two years? Over the course of your life? What does this do for your faith?
10. What do you observe in everyday life that shows the presence of God?
11. Write out your personal story ("testimony") so that it could be shared in two minutes or less. What moved you towards trusting in Christ? How have you changed as a result?
12. What additional evidence would you include?

Chapter Eight

Work, Profession, and Vocation

Summary-

Chapter Eight examines the concept of work, “sacred” and “secular” classifications, and the idea of engineering as both a profession and a vocation (literally, a “calling”).

Major sections:

- The two-pot system
- Dangers of dualism
- Work and the fall
- Engineering –a profession
- Engineering –a vocation
- Work and the Reformation
- Calling and purpose
- Theology of work
- Work as worship

Appendices available-

8A More on Work and Vocation

8B More on Dualism

8C Don’t Despise the Earth

Chapter Eight

Work, Profession, and Vocation

Questions for Reflection and Discussion

1. Do you agree that "sacred" and "secular" categories are artificial, rather than truly Biblical?
2. Is the concept of avoiding "two-pot" thinking useful to your Christian life?
3. Where else do you see evidence of dualistic thinking?
4. Why are you "working" today? What is the real motivation?
5. How can you "practice the presence of God" in your daily work?
6. How can you- specifically- give God glory through your work?
7. Are you implementing multiple "callings" in your life? What is God currently "calling" you to?
8. How did God prepare you for your studies or career?
9. How can the concept of "calling" affect your approach to work?
10. How can you specifically add value to your workplace?
11. When have you thought about your work as a form of worship? How might you live that out?
12. Where do you see work becoming an idol? What is the actual source of your identity and self-esteem?
13. What is unique about a believer in the workplace?
14. Fletcher Tink (Conclusions) suggests multiple reason for a Christian to work. In which of these might you need to grow this week?

Chapter Nine

God and the Engineers

Summary-

Chapter nine looks at ways in which God interacts with engineers, including the idea of God as the original Engineer.

Major sections:

- God as an Engineer
- God communicates to engineers
- God as a Designer
- God and creativity
- God designed the earth for engineering
- Theology of engineering
- Jesus and the engineers

Appendices available-

9A More on Creativity

9B The Faith of the Engineer

Chapter Nine

God and the Engineers

Questions for Reflection and Discussion

1. In what additional ways has God "done engineering"?
2. How has God been "engineering" your life?
3. How has God been building, refining, sharpening, strengthening, and testing you?
4. What would you add to a theology of engineering?
5. How might your understanding, as an engineer, of the nature of God differ from, say, that or an artist?
6. Where do you primarily see evidence of God's creativity? How is it an example to you?
7. In early 2023 the Electric Grid in South Africa is close to total collapse with all the incumbent consequences: no electricity, no water pumping, no water purification, no heat, no light, no security, no internet, and no air traffic control. How might engineers bring God's wisdom to bear in this situation?
8. How can the concept of "from God…to God" affect your design work this year?
9. Does your "quest for meaning… precede your quest for money"? How does this affect your decisions?
10. How (specifically) has engineering been affected by the Fall?
11. How is engineering a "common grace" activity?
12. How do you see engineering in relation to the Cultural Mandate of Gen. 1:28? How (specifically) can you manifest this Cultural Mandate this week?
13. Do you think that science and technology make it easier or harder to trust in God?
14. Do you expect any forms of engineering in heaven/ the new creation?

Chapter Ten

Engineers and God

Summary-

Chapter Ten examines ways in which engineers relate to God, particularly in the ways we consciously practice engineering.

Major sections:

- How engineers relate to God-advantages
- How engineers relate to God- disadvantages
- Defining Christian engineers
- Practicing engineering as love for God
- Practicing engineering as love for our neighbor
- Typical temptations for engineers

Appendices available-

10A Engineering Theology

10B Material and Spiritual Aspects

10C More on Theology and Engineering

Chapter Ten

Engineers and God

Questions for Reflection and Discussion

1. How does the engineering mindset help you relate to Christ?
2. How does the engineering mindset create obstacles to your Christian growth?
3. How can logic be useful in discussions about engineering and faith?
4. How have you found the principles of the Gospel logical and something where you could place your confidence?
5. How could the order and complexity of the universe be useful in helping a technical person relate to God?
6. Which of the typical shortcomings of engineers do you identify with? What steps might you take this week to change that?
7. Have you struggled with wanting to fix everything, including people?
8. How do you deal with the imperfections of the real world?
9. How can we stop over-relying on our own understanding?
10. Do you feel the need to control everything in life? How do you deal with that?
11. How do each of these verses lead you to a Biblical response (Because… therefore I…): Rom. 6:1-13, Rom. 8:1-17, Rom. 12:1, 2 Cor. 5:18-21, Cor. 7:1, Gal. 5:1, Eph. 4:3, Phil. 2:1-5, Heb. 10:19-20, Jas. 2:1-7.

    Which of these principles is most special to you? How do you see yourself thinking this way as a Christian engineer?
12. How would you define “responsible technology”?
13. What is your true motivation for a tackling an engineering project?
14. How might you fall into a pride trap in your education or your work?
15. When have you viewed an issue at work differently from your colleagues because you were a believer?
16. How are your relationships at work different because of your faith?
17. What other issues arise for a Christian in engineering?

Chapter Eleven

Christians and Science

Summary-

Chapter eleven examines science as foundational to engineering and the proper understanding and role of the physical sciences.

Major sections:

- Brief history of science
- Assumptions and presuppositions of science
- Limitations of science
- Science and worldviews
- Theology of science
- Positions regarding science and faith
- The “two books” analogy
- Science and interpretation

Appendices available-

11A The Quantum Universe

11B Spiritual Physics

11C Early scientists

11D The Two Cultures

Chapter Eleven

Christians and Science

Questions for Reflection and Discussion

1. Have you ever had to explain the difference between science and engineering?
2. Have you experienced or discovered a conflict between science and religion?
3. "Science is not reality. It can only model and explain reality. Science deals with models of reality." Does this statement undermine your confidence in science and engineering? Why or why not?
4. "We are encouraged to study the world God made. 'It is the glory of God to conceal a matter. It is the glory of kings to search out (research) a matter.' " (Prov. 25:2).

   How might the implications of this idea impact your science and engineering laboratory experiments?
5. What additional assumptions might be required for science?
6. What additional limitations of science do you see?
7. What additional ideas from Scripture do you find about nature and science?
8. How has the Fall negatively impacted science?
9. Is the "two-books" analogy helpful in viewing science and faith? How?
10. "God's sovereignty (over Nature) means that: Subatomic particles can move randomly, yet whole atoms always act in a prescribed way. Heated gas particles can arrange themselves… An enemy may attempt to do harm or evil, yet God can turn the result to good. (Joseph : Gen. 50:20) Every person on earth can make real decisions, yet God's ultimate purposes will be accomplished. (Acts 4:26-28)"

    How, specifically, do these statements affect your confidence in your future and your daily life?
11. "Science, understood as the study of what God made, should lead us to worship."

    When was the last time this statement was true for you?
12. "Science is incapable of telling **why** things happen."

    Does this statement increase your faith in God or decrease it? Why or why not?
13. What guidelines would you suggest in interpreting nature?

Chapter Twelve

Faulty Understanding and Faulty Use of Science

Summary-

Chapter twelve looks at faulty approaches to science, particularly the fallacy that science can explain everything.

Major sections:

- No God of the gaps
- Misunderstandings in science
- Modern-modern science
- Scientism
- Science and idolatry
- Science and miracles
- Modern science and God

Appendices available-

12A More on Scientism

12B More on Miracles

12C Steps towards the Death of Science

12D The Gospel according to Carl Sagan

Chapter Twelve

Faulty Understanding and Faulty Use of Science

Questions for Reflection and Discussion

1. How do you view the "conflict" between science and faith? Where have you struggled with this issue?
2. What are the difficulties with a "God of the gaps" approach?
3. Science historian at Cornell University Will Provine "described intelligent design as an 'utterly boring' theory, one that offers the 'same answer for every irreducible mechanism.'" And since science can't be done without an innate curiosity, they reason, creationists are not actually scientists… Comment on Will Provine's description of Intelligent Design. Comment on his statement that creationists are not scientists.
4. What difficulties do you see with a mechanistic "clockwork" universe?
5. Describe how the Watchmaker god differs from the God of the Bible.
6. Describe the difference between Relativity and Relativism. Why is this difference important?
7. What other scientific misunderstandings have you encountered in the church or in the general population?
8. Ronald Numbers (*Galileo Goes to Jail*) documents a number of popular "myths" about the history of science. Where have you encountered some of these?
9. Explain the difference between Francis Schaeffer's terms: **Modern Science** and **Modern-Modern Science**.
10. Comment on philosopher Alex Rosenberg's definition of *scientism.*
11. Is it helpful to distinguish "scientism" from pure science?
12. Give examples of how "scientism leads to objectifying nature and dehumanizing people."
13. Why could pure objectivism be considered a myth?
14. How does the "Copernican principle" differ from Copernicus' original thoughts?
15. How do miracles fit with "laws of nature"?
16. The chapter ends with a series of "Affirmations." Which of the "Affirmations" do you agree with? Which ones do you not disagree with? Why?

Chapter Thirteen

Mathematics

Summary-

Chapter thirteen examines mathematics as foundational to engineering and the amazing mathematical structure of the world.

Major sections:

- Brief history
- Christian mathematicians
- Nature, math, and God
- Math and Christian thinking
- Theology of mathematics
- The unreasonable effectiveness of mathematics

Appendices available-

13A The Cross and the Delta Function

13B Flatland

13C Probability and Sin

13D Philosophy of Mathematics

Chapter Thirteen

Mathematics

Questions for Reflection and Discussion

1. How has your view of mathematics changed as you went further in your studies?

2. Do humans invent mathematics, discover mathematics, or both? How?

3. What do you think of Max Tegmark's claim that the fundamental nature of the universe is mathematical?

4. Where else do you see examples of math in nature? How might these point to God as Creator?

5. Can you think of other examples of logical arguments in Scripture?

6. Does the understanding that God is logical (as well as loving) give you peace when circumstances seem illogical?

7. How does the infinite nature of God fit or not fit with mathematical conceptions of infinity?

8. "Mathematics, rightly understood, should move us towards thinking about God, and even to worship." Explain how this can be true.

9. How would you answer this question: "Is it possible that math simply hasn't progressed far enough yet to be able to explain the amazing fit of mathematics to the physical universe?"

10. Is God simply the "Great Mathematician?" Explain your answer.