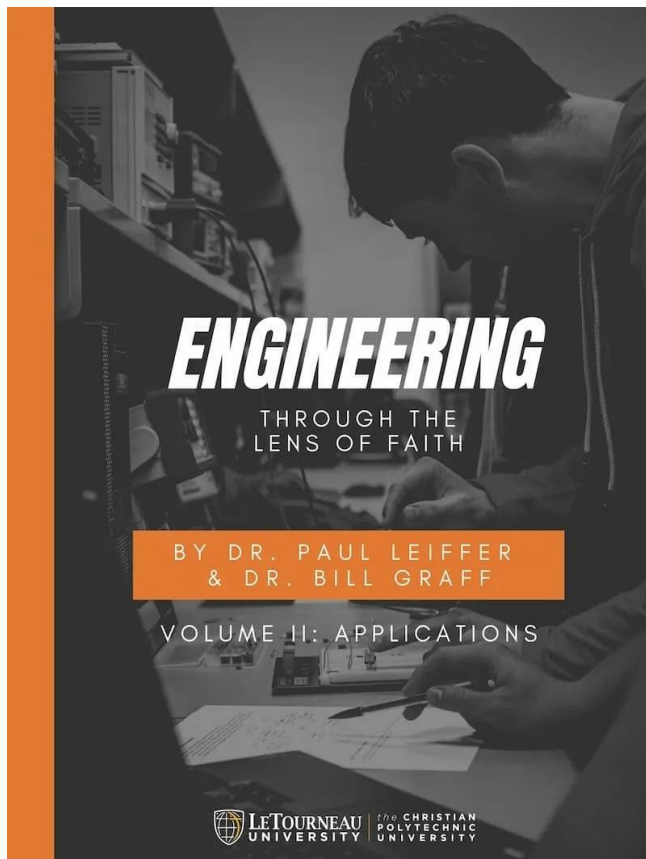


STUDY GUIDE for ENGINEERING THROUGH THE LENS OF FAITH

VOLUME 2: APPLICATIONS

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.

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Chapter 14

Design

Summary

Chapter 14 introduces the concept of design, a key task of engineers and a key action of God in creation.

Major sections:

- Engineering Design
- Design Flaws and Failures
- Design and God
- Recognizing Design
- The Argument for God from Design
- Design and the Human Body
- Imperfect Design?
- Real and Apparent Design

Appendices available:

14A More on Fine-Tuning in Design

14B The Multiverse

14C The Privileged Planet

14D Additional on Design

14E Design and the Human Body

Chapter 14

Design

Questions for Reflection and Discussion

1. Do you agree that we are-in a small way- imitating God when we do design?
2. What is the place of creativity in design?
3. Consider the “classical design constraints: Safety, Cost, Aesthetics, Ethics, Reliability, Maintainability, and Environment.”

Consider designing a new device to toast bagels.

- a. List five specific design constraints on your possible design.
 - b. Conceptually design four possible *devices* that could accomplish this task.
4. “Design should be done with people in mind.” How do your designs for Question 3 include the idea of designing “with people in mind”?
 5. Choose your “best” design out of those above. How does this design consider the “Good Design characteristics” mentioned in the text?
 6. What aspect of design in the world (solar system, ecosystem, human body,...) seems most impressive? Why?
 7. What do you think of the alternate explanation (to fine-tuning): that an infinite number of universes exist and we happen to live in the “lucky one” where life can exist?
 8. What test(s) would you propose to suggest that that something is deliberately designed rather than shaped or assembled randomly?
 9. How do you respond to the idea that you (your body) was specifically designed to worship and glorify God and to bless others? What specific experiences in your life indicate that God has designed you for such a purpose?
 10. “We were not designed for constant pleasure, personal fulfillment, or freedom from all pain and suffering. Scripture makes it clear that we (our minds and bodies) were designed to give glory to God.”

List three specific applications of these principles in your life.

Chapter 15

Ethics

Summary

Chapter 15 deals with the nature of ethics in the engineering profession, the Code(s) of Ethics, and handling ethical issues.

Major sections:

- Engineering Ethics
- Education for Ethics
- Engineering code of Ethics
- Motivation to Act Ethically
- Non-Specific Ethical Areas
- Worldviews and Ethics
- Christians and Ethics

Appendices available:

15A The Parable of Pi

15B Engineering Disasters

15C The Conscience and Ethics

15D Additional Ethical Considerations

Chapter 15

Ethics

Questions for Reflection and Discussion

1. Why is it essential that engineers act in an ethical manner?
2. How does engineering ethics differ from other areas of professional ethics (law, medicine, business)?
3. What (specific) ethical issues have you encountered in the workplace?
4. Consider the quote that begins the chapter: “.... *I was a German engineer... and I saw it as my duty to apply my specialist knowledge in this way in order to help Germany win the war. Just as an aircraft construction engineer builds airplanes in wartime, which are also connected with the destruction of human beings.*” Evaluate this engineer’s statement.
5. Consider “The Day America Told the Truth.” What amount would have to be offered to you to entice you to steal/release the answers to a university Calculus exam? \$1,000? \$10,000? \$1,000,000? Or...?
6. Consider *The Incident at Morales* summary. When was the last time you compromised your ethical standards? How? What was the result?
7. What does the phrase “hold paramount” (Code of Ethics) suggest to you?
8. Consider that we should “avoid conflicts of interest.” When was the last time you encountered a conflict of interest? How did you handle it?
9. Which of the approaches to undefined ethical issues seems most applicable to you? Why?

Chapter 16 Summary

Engineers, Social Justice, and Poverty

Summary

Chapter 16 looks at the issue of poverty, the first of three areas of applied ethics that has been emphasized as part of a “social justice” approach.

Major sections:

- Applied Ethics and Social Justice
- Justice and Mercy
- Myths about Poverty
- Causes of Poverty
- Mindset of Poverty
- Theology of Poverty
- Engineers and Poverty

Appendices available:

16A Principles of Biblical Economics

16B Multiple Christian Views on Economics

16C The Failure of Socialism

16D The Failure of Capitalism

Chapter 16 questions

Poverty

Questions for Discussion and Reflection

1. What are the Bible's key teachings about wealth, poverty, and needs of the poor?
2. What would you see as primary causes of poverty?
3. "Justice in practice involves at least five concepts." Have you violated any of these concepts this week?
4. Justice and mercy are both important themes in the Bible. It is easy to act with indifference to hurting people. How have you responded to hurting people this week?
5. God calls for a compassionate response to the sick, the poor, widows, orphans, outcasts, prisoners, refugees, strangers and aliens. Who are these in your town? What ministries are working with each of these groups?
6. Why do the authors say that there is nothing in the Code of Ethics making engineers responsible for solving the problem of poverty?
7. "Love of money instead of love for people results in all sorts of evil." Have you battled this evil recently?
8. Do you view the "poor" as being more spiritual than those who have more money than you?
9. "There are no 'undeserving poor.' There are only poor. All of us are undeserving when it comes to God's grace." Do you agree? Why or why not?
10. How might the "gleaning" concept be practiced in your community?
11. Do you see a difference between overseas poverty and poverty in this country?
12. What steps could you, as an engineer, take to diminish poverty?
13. How might you live more simply?

Chapter 17

War and Peace

Summary

Chapter 17 looks at issues of war and peace from the standpoint of engineering ethics and Christian teaching. The two most well-known positions are Christian Pacifism and Just War Theory. Both have strengths and weaknesses.

Major sections:

- Engineers and War
- Christian Pacifism
- Just War Theory
- Spectrum of Christian Positions
- Engineers and the Defense Industry
- Engineers and Social Responsibility

Appendices Available:

17A Blessed are the Peacemakers

17B Thoughts on Spiritual Warfare

Chapter 17

War and Peace

Questions for Discussion and Reflection

1. What are the Biblical principles behind just war and pacifism?
2. Where do you stand on the overall issue of warfare? Why?
3. How does the follower of Christ (called to be a peacemaker) differ from the citizen of Israel in Old Testament times (called to fight for Israel)?
4. “James is writing to a church about quarrels and fights that arise internally, but the reason given is the root cause of all conflicts: self-driven cravings, whether for property, power, conquest, or destruction.” We might define this as “covetousness,” forbidden in the 10th commandment. Where have you seen covetousness manifested in your own life this past week? What do you plan to do about it?
5. Consider the position of the “social justice” authors and the arguments given against the social justice movement. Which position do you lean toward, and why?
6. Explain how “(a) case can be made for a national military, based on Biblical truth.” Can this be consistent with Jesus’ Sermon on the Mount, specifically the command to “turn the other cheek”?
7. Was Jesus a perfect pacifist? Explain your answer.

8. Summarize the “Just War” theory. Do you agree with this position?
9. Which of the “four legitimate positions Christians have taken on warfare” do you most closely align yourself with?
10. Is defense work a violation of the First Canon of the Engineering Code of Ethics (“Engineers shall hold paramount the health, safety, and welfare of the public.”)? Why or why not?
11. “The Christian is specifically called by God to peace and peacemaking.” Where and with whom is God calling you to be a peacemaker?

Chapter 18

Engineers and the Environment

Summary

Chapter 18 examines major environmental problems and the ethics of various approaches proposed to solve them.

Major sections:

- Rethinking Ethics and the Environment
- Worldviews and the Environment
- Theology of the Environment
- Engineers and the Environment

Appendices available:

18A Environmentalism and a New Ethics

18B Christians and the Environment

18C Christian Environmental Organizations

Chapter 18

Environment

Questions for Discussion and Reflection

1. What do we learn from Scripture about God's view of our planet?
2. Have engineers primarily helped or hurt the planet? How?
3. Which environmental concerns can we reasonably address?
4. How can we properly care for the environment without becoming pantheists or radical environmentalists?
5. What would it mean to "exercise dominion without tyranny"?
6. What place have pride and ambition played in our ecological problems?
7. What insights can we gain from the two verbs used in Genesis 2:15?
8. How can the stewardship principle help us to frame environmental issues?
9. What steps can engineers take in their designs to keep the environment healthy?
10. How-specifically- can you show respect and appreciation for what God has made?
11. What reasonable and practical steps could you take to protect the environment?

Chapter 19

Technology

Summary

Chapter 19 introduces some of the issues regarding technology and its impact on our society and on our individual lives.

Major sections:

- Brief Overview of Technology
- Observations re Technology
- Pictures of Technology
- Approaches to Technology
- Is Technology Neutral?
- Technological Determinism
- Dangers of Technology
- Technology Impacts Society
- Responsibility of Engineers

Appendices available:

- 19A Francis Bacon
- 19B Christianity and Progress
- 19C Philosophy and Ethics of Technology
- 19D Technology as Frankenstein

Chapter 19**Technology****Questions for Discussion and Reflection**

1. How would you define technology?
2. Why has technology become a major factor in American life?
3. How has technology affected you-positively or negatively-in each of these areas: expanded choices, expanded abilities, lifestyle changes, and amount of free time?
4. Do you think technology is neutral? Why or why not?
5. Do you agree with Newberry that engineers tend to be “proximate instrumentalists”? Why?
6. When does technology appear to be a threat?
7. To what extent does technology make everything into an object or a machine and a means to an end? How?
8. Is it ethical to use medical brain imaging tools to evaluate the effectiveness of advertising? Why?
9. When have you experienced unexpected consequences from a specific design or an item of technology?

10. What do you see as the major potential danger of technology?
11. What (specific) positive and negative contributions has technology had in your life?
12. What steps can we take to maximize the good and minimize the destructive aspects or influences of technology?

Chapter 20

Theology of Technology

Summary

Chapter 20 examines technology from a theological framework, noting what Scriptures indicate use of technology and what guidelines we might find for our use of technology.

Major sections:

- Christian Opposition to Technology
- Technology in the Bible
- Technology and Church History
- Technology and Creation
- Evaluating Technology
- Technology and Eschatology

Appendices available:

20A Babel and Technology

20B Borgmann and Technology

20C Technology and the Movies

20D Christians and Fear of Technology

Chapter 20**Theology of Technology****Questions for discussion and reflection**

1. Why have Christians often opposed technology?
2. How does the Dominion Mandate (Gen. 1: 28) relate to technology?
3. What values do you associate with technology?
4. How has technology changed you, for better or for worse?
5. How might technology lead to idolatry?
6. “Technology makes the (seven) deadly sins even more accessible.” How does this play out? Give a specific example.
7. Which of Monsma’s technology norms impresses you most?
8. How can the stewardship principle help us with technology decisions?
9. What technology might you need to fast from this week? How will you do it?
10. What would you add to a statement of “theology of technology”?

Chapter 21

Screen –Based Technology

Summary

Chapter 21 looks at five examples of screen-based technology (television, computer, video games, the internet, smart phones), considering their impacts, advantages, and disadvantages/dangers.

Major Sections:

- Television
- Video Games
- Computers and the Internet
- Smart Phones

- Dangers of Screen Based Technology
- Evaluating our Use of Screen Based Technology
- Handling our Technology

Appendices Available:

21A Broader or Narrower

21B More on Screen Technology

21C Are We Living in a Simulation?

Chapter 21

Screen-Based Technology

Questions for Discussion and Reflection

1. Why has screen-based technology become such a dominant influence in our daily lives?
2. How do today's smartphones differ from desktop computers of twenty years ago?
3. When does violence in video games become unacceptable?
4. What do we gain and what do we lose when we adopt screen technology?
5. Does your screen technology bring you closer to others or separate you from others?
6. What areas do you wrestle with regarding screen technology?

7. Do you find it easy to be distracted by screen technology?
8. How do you handle your own screen technology?
9. Have you tried a “technology fast”? Was it beneficial?
10. What additional suggestions might keep us balanced and growing in our use of screen technology?

Chapter 22

Brave New World of Technology

Summary

Chapter 22 examines the rapidly changing technological horizon, focusing on three primary areas impacting society: Artificial Intelligence (AI), robotics, and augmentation of humans.

Major Sections:

- Modern Technologies Mega Shifts
- AI
- Robotics

- Robotics and Ethics
- Transhumanism and the Singularity

Appendices Available:

22 A What Does It Mean to be Human?

22B The Image of God and Transhumanism

22C Human Limits

22D More on AI and Robotics

22E Consciousness

Chapter 22**Brave New World of Technology****Questions for Discussion and Reflection**

1. What do you see as the biggest technology issue on the horizon? Why?
2. Do you expect AI to be primarily a great benefit to society or an “existential risk”? Why?
3. What ethical issues might accompany expanded use of AI?
4. What restrictions, if any, would you place on general AI development?

5. Do you expect to see “fully conscious AI”? Why or why not?
6. What differences do you see between humans and computers?
7. What comprises the essence of being human?
8. In what ways are humans superior to computers?
9. How could AI be used for helping the needy or for spreading the Gospel?
10. What impacts do you expect from widespread use of robotics in industry?
11. What issues do you see with household robots? Robot assistants? Robot companions?
12. What are the ethical issues with robotic warfare?
13. What are the Biblical difficulties with transhumanism?
14. Do you expect to see brains uploaded to computers? Why?
15. Where should we draw the line on modifying humans?

Chapter 23

Workplace

Summary

Chapter 23 focuses on the engineering workplace as the “real world,” the “lab” where we put theory into practice, and the primary place where believers get to live out their lives and impact others. What attitudes, character traits, and actions are needed to bless the workplace as Christ’s “salt and light”?

Major Sections:

- Importance of the Workplace
- Character Traits and Attitudes
- Blessing and Impacting the Workplace
- Workplace Culture
- Workplace Flourishing
- Work-Life Balance
- Difficulties and Challenges
- Workplace Survival

Appendices Available:

- 23 A Faithfulness and Christian Imperialism
- 23B Some Technical Christian Companies
- 23C How Product Engineering Companies Fail
- 23D Biblical Responses to Workplace Problems
- 23E The Ideal Workplace

Chapter 23

Workplace

Questions for Discussion and Reflection

1. In what ways does the workplace become the “laboratory” for living out what you learn?
2. Have you seen or experienced good examples of Christians in the workplace? Bad examples? How?
3. What specific benefits should a Christian employee bring to the workplace?
4. Do you agree that believers were hired primarily to work for the company? Why?
5. How (specifically) can you make a difference for Christ in your workplace?
6. What does it take to establish credibility at work?
7. What is the company culture at your place of work? How can you promote a positive culture?
8. What kinds of interpersonal issues have you run into in your workplace? How did you handle them?
9. What kinds of workplace “politics” have you experienced? How have you dealt with these?
10. Have you experienced actual hostility towards your beliefs? How did you deal with it?
11. How (specifically) can you pray for your fellow workers?
12. How are you doing with work-life balance? What practices help the most?
13. What is the most difficult challenge you face regularly at the workplace? How can Christ’s teachings and the Holy Spirit’s power help you deal with this challenge?

Chapter 24

Education

Summary

Chapter 24 surveys the field of higher education, particularly Christian impact on education and Christian institutions offering engineering degrees.

Major Sections:

- Importance of the University
- Christians in Higher Ed.
- Christian Higher Education
- Integration of Faith and Learning
- Engineering Education
- Christian Higher Education
- Education, Worldviews, and Theology

Appendices Available:

24A The Perry Model

24B Educational Thoughts –1

24C Educational Thoughts -2

24D Preserving Quality with Soul

24E Christian Higher Education is Unique

Education

Questions for Discussion and Reflection

1. What is the impact of the university on modern society?
2. What do you see as the purpose of higher education?
3. What do you see as the main problems in current higher education?
4. Do you agree with the current thinking that that a university education is no longer necessary to succeed in this society? Why or why not?
5. What teachers/professors have had an impact on your life? How?
6. How might Christian higher education differ from “secular” higher education? In what ways will it be similar or identical?
7. How would you define and approach the “intersection of faith and learning”?
8. Have you experienced a classroom that truly honored Christ? How was it accomplished?
9. How does engineering education differ from education in the liberal arts?
10. What changes would you make to the way your courses were taught?
11. How (specifically) could a Christian professor make a significant difference at a “secular” university?

Engineers and World Missions

Summary

Chapter 25 looks at world missions, a key focus of believers, and how we can all be involved in the Great Commission. There are unique opportunities for engineers and technical people in world missions.

Major Sections:

- Biblical Basis for Missions
- Historical Background
- Traditional Missions Efforts
- Missions Myths and Misconceptions
- Missions Today
- How Technology Has Changed Missions
- Engineers and Missions

Appendices Available:

25A Mission Agencies

25B Additional Thoughts on Missions

25C Praying for Missionaries

Chapter 25

World Missions

Questions for Reflection and Discussion

1. How would you paraphrase Mt. 28's statement of the "Great Commission"?
2. What would you say is the most important reason for world missions?
3. How does the Great Commission impact your life?
4. Have you been able to participate in any world missions activity in any capacity? What did you do?
5. What additional myths about missions have you encountered?
6. How has world missions changed over the past century?
7. How has technology changed approaches to world missions?
8. How might "tentmaking" be a natural fit for engineers?
9. In what additional ways could engineers support the cause of world missions?
10. It has been said that "Mission begins at home." When have you recently shared the Gospel with someone? Do you know a basic outline for sharing the Good News?
11. How could you be more involved in Christ's work around the world?

Chapter 26

International Development

Summary

Chapter 26 examines ways engineers can make a difference overseas in relief and development efforts. Such efforts must be done professionally, be approached wisely, and must fit into the local culture.

Major Sections:

- Missions and Development
- Poverty and Development
- Development Problems and Failures
- Sustainable development
- Engineering and Development
- Humanitarian Engineering
- Christian Humanitarian Engineering
- Appropriate Technology
- Financial Approaches to Poverty

Appendices Available:

26A Development Agencies

26B More on Appropriate Technology

Chapter 26

International Development

Questions for Reflection and Discussion

1. How does God's concern for the poor translate into international development work?
2. How does international development fit with a non-dualistic (no sacred/secular barrier) approach to Christianity?
3. How does international development fit with world missions?
4. How might attempts to help an underdeveloped area create more harm than good?
5. What guidelines for emergency relief efforts would you suggest?
6. Have you taken part in any international development or relief project? What did you do?
7. What would be the advantages and disadvantages of working with a "secular" NGO?
8. What guidelines would you suggest for anyone doing engineering work in a foreign culture?
9. What do you see as the greatest needs in developing countries in Central America? Asia? Africa?
10. What low-level "appropriate technology" projects might prove very helpful in a country like Burkina Faso?
11. In 2021, over 75,000 Afghan people hastily fled their home country before the Taliban took control. Many of these refugees were sent to Houston, TX. Consider the goals of Christian Humanitarian Engineering. What immediate needs would you attempt to address? What questions would you need to ask to determine long-term needs?
12. Consider the citizens left behind in Afghanistan. What describes their condition? Economically? Medically? Physically? What agencies are working with these individuals? How might you or your church help address some of these needs?

Chapter 27

Examples

Summary

Chapter 27 highlights four engineers who saw their work as ministry for God and accomplished great things through their talents.

Major Sections:

- R. G. LeTourneau
- Wilson Greatbatch
- Herb Jacobson
- Ken Crowell
- Other Examples of Christian Engineers

Appendix available:

27A More on R. G. LeTourneau

Chapter 27

Examples

Questions for Discussion and Reflection

1. Are you familiar with the technical “heroes of the faith” profiled in the chapter? What else do you know about them?
2. What did each of the men profiled have in common?
3. What strikes you most from the lives of these men?
4. With which of them do you identify most strongly? Why?
5. What do you think of the advice given to R.G. LeTourneau, that God needs businessmen as well as pastors and missionaries?
6. What do you think of R.G. LeTourneau’s conclusion about stewardship, that it’s not how much of my money I give to God but how much of God’s money I keep for myself?
7. Who has impacted you as a technical leader? In what way, specifically?
8. Who else would you suggest as an example of a Christian engineer impacting the world?

Chapter 28

Conclusions

Summary

Chapter 28 reviews the highlights of the previous chapters and offers conclusions.

Major Sections:

- Faith and Christian Living
- Worldviews and Evidence
- Work, Profession, and Vocation
- Science and Mathematics
- Ethics
- Technology
- Workplace
- World Missions
- Engineering and God's Promises

Appendices available:

28A Mythbusters

28B Recommended Reading

28C Final Ultimate Conclusions

Chapter 28

Conclusions

Questions for Discussion and Reflection

1. Which of the chapters or topics impacted you the most?
2. After completing the book, what additional insights have you gained?
3. What actions or changes do you plan to make as a result of what you've read?
4. What additional topics do you think a Christian engineer should consider?

