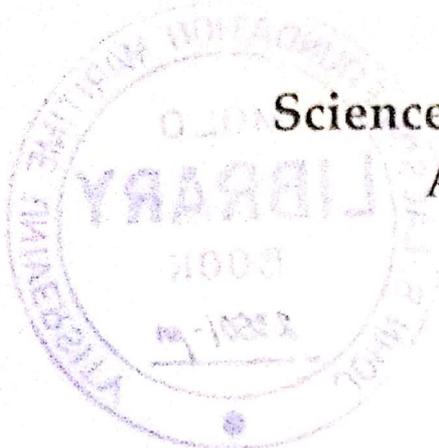


**SCIENCE,  
TECHNOLOGY  
AND SOCIETY**  
A Critical Approach

Antonio P. Contreras  
Dennis S. Erasga  
Roberto E. Javier, Jr.

PH  
508.3  
C764  
2018  
c-3





# Science, Technology and Society: A Critical Approach

Copyright © 2018  
Antonio P. Contreras  
Dennis S. Erasga  
Roberto E. Javier Jr.

ISBN: 978-621-406-180-8

**ALL RIGHTS RESERVED.** No part of this work covered by the copyright hereon, may be reproduced, used in any form by any means – graphic, electronic, or mechanical, including photocopying, recording, or information storage and retrieval systems – without written permission from the authors.

**Published by: MINDSHAPERS CO., INC.**  
Rm. 108, Intramuros Corporate Plaza Building  
Recoletos cor. Cabildo Streets  
Intramuros, Manila  
Tel. no. (02)6230384  
Telefax no. (02)527-6489  
Email: [mindshapersco@yahoo.com](mailto:mindshapersco@yahoo.com)

**Cover Design: ERWIN O. BONGALOS**  
**Layout: BAB**

# TABLE OF CONTENTS

---

Introduction .....	iii
<b>Unit 1. SCIENCE, TECHNOLOGY AND SOCIETY FROM A CRITICAL HISTORICAL PERSPECTIVE .....</b>	<b>1</b>
<i>Chapter 1.</i> Social Forces and How They Impinge on the Work Scientists as Social Entities .....	2
<i>Chapter 2.</i> Theories and Concepts of Science and Technology .....	7
Why Study Science and Technology Vis-a-vis Society? .....	9
<i>Chapter 3.</i> Nature of Science and Technology .....	19
Science Vis-a-vis Other Forms of Knowing .....	19
The Scientific Method .....	21
<i>Chapter 4.</i> Science as a Social Product .....	27
The Political Economy for the Production of Science and Technology .....	27
The "Production" of the Scientist .....	28
The "Production" of Scientific Knowledge and Technology .....	30
<i>Chapter 5.</i> The Scientific Work Ethic .....	35
The Case of the Social Sciences .....	37
<i>Chapter 6.</i> Historical Perspectives on the Interactions of Science, Technology and Society .....	43
Significant Events in the History of Science and Technology .....	43
Scientific and Technological Knowledge .....	43
Technological Inventions and Discoveries .....	56
Approaches to the Study of the History of Science .....	71
Theories on the Nature of the Development of Scientific Knowledge .....	72

**Unit 2. THE SOCIAL DIMENSIONS OF SCIENCE AND TECHNOLOGY ..... 81**

*Chapter 7. Science, Technology and the Development Process..... 82*

Process..... 82

The Development Process..... 82

Theories of Social and Technical Change..... 83

*Chapter 8. Social, Political and Economic Development Vis-a-vis the Development of Science and Technology..... 89*

Science, Technology and Modernization..... 89

Science, Technology and State-building..... 91

Science, Technology and Capitalism..... 93

Science, Technology and Globalization..... 95

*Chapter 9. Science, Technology and the Power Relations in Society ..... 101*

Power Relations in Society ..... 101

Science, Technology and Class Relations ..... 105

Science, Technology and Gender Relations ..... 108

Science, Technology and Cultural Relations..... 110

*Chapter 10. Science, Ethics and Ecology ..... 121*

The Ethics of Science ..... 121

Ethical Implications of Scientific Knowledge... 122

Environmental Ethics and Scientific Knowledge 124

**Unit 3. CRITICAL ANALYSIS OF THE INTERRELATIONSHIPS BETWEEN SCIENCE, TECHNOLOGY AND SOCIETY ..... 131**

*Chapter 11. Framework for Critical Analysis of Science and Technology..... 132*

Critical Social Theory ..... 132

The Ideology of Science and Technology ..... 136

Alternative Frameworks for Analyzing the Relationships Between Technology and Society..... 138

<i>Chapter 12.</i>	Approaches to Technology Impact Assessment	143
	Stakeholder Analysis.....	143
	Technology Impact Profiling.....	145
	Technology Access and Control Profile.....	145
	Technology-Related Decision-Making Profile.....	146
	Technology Benefit and Burden Profile.....	147
	Technology Environmental Impact Assessment .....	148
	Technology Social Impact Assessment.....	150
	Benefit-Cost Analysis .....	150
	Class Analysis.....	151
	Gender Analysis.....	152
	Cultural Analysis .....	153
<b>Unit 4.</b>	<b>SCIENCE, TECHNOLOGY AND GOVERNANCE.....</b>	<b>157</b>
	<i>Chapter 13.</i> Issues, Dynamics and Challenges of Science Governance .....	158
	Science-governance Connections .....	160
	Limitations and Prospects for Science-based Governance.....	161
	Challenges for Global Science Governance .....	162
	Role of Epistemic Communities .....	168
	The Role of Science in Regional Governance: The Case of ASEAN Environments .....	169
	 <i>Chapter 14.</i> Science Policy and Institutions in the Philippines .....	183
	National Science Policy.....	183
	Institutional Framework for Science and Technology.....	184
	 <i>Bibliography</i> .....	199