STUDENT HANDBOOK
DIPLOMA IN RADIOGRAPHY
SESSION 2020/2021

SCHOOL OF MEDICAL IMAGING

FACULTY OF HEALTH SCIENCES

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10TH EDITION AUGUST 2020
UniSZA/SOMI/Rad/Student Handbook

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2.0 PROGRAMME INFORMATION

Radiography is also known as medical imaging or diagnostic imaging. It refers to a technique, process or an art of creating visual representations of body for clinical analysis and medical intervention. The main purpose is to reveal the conditions of internal structures without surgical intervention. Diploma in Radiography is a programme related to the science of imaging and diagnostic which encapsulate the production of radiographic images of internal organs by using ionizing or non-ionizing radiation, such as X-rays, gamma rays, high frequency sound waves and magnetic field.

The main aim of this programme is to produce proficient and competent radiographers with world class ranking. Therefore, various activities in the area of education, practical and skills development are included.

A radiographer is responsible to provide safe, fast and accurate radiographic examinations with the use of a wide range of imaging modalities. These include the conventional and digital radiography (C/DR), Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasonography (US), Angiography, Mammography and Radionuclide Imaging (RNI). In addition, aspects of image recording and processing, patient care and safety, communication and handling issues, human anatomy and pathology, instrumentation management and handling and radiation safety principles are also included.

2.1 Objectives

To provide the students with the sufficient knowledge and skills in the field of radiography with regards to the Islamic values.

2.1.1 Programme Education Outcomes (PEO)

To produce graduates who can:

i. use knowledge and practical skills of medical imaging to produce quality images and to handle imaging modalities ethically and professionally.
ii. communicate effectively with clients, staff and public and demonstrate good leadership skills in an organization.
iii. apply entrepreneurship and problem solving skills, good management and planning in healthcare services.
iv. apply life-long learning skills and show interest in current based practice and advanced knowledge in medical imaging sciences update for career development.

2.2 Duration and Type of Study

2.2.1	Type of Study	:	Full-time only
2.2.2	Duration of Study	:	Minimum 3 years (6 semester + 1 short semester) Maximum 5 years (10 semester)

2.3 Career Opportunities

2.3.1 Clinical/Healthcare personnel

Work as a diagnostic radiographer at government or private institutions (hospitals, clinics, medical centres, etc.).

2.3.2 Industrial/Sales

Work as an application imagign specialist at international leading medical companies such as Siemens Medical, PHILIPS healthcare, GE Healthcare etc.

2.3.3 Management

By years, will climb up to become a chief, manager or head of department.

2.3.4 Academics

Opportunity to further study at degree level before being able to pursue a postgraduate course and become a university lecturer.

2.4 Programme Learning Outcomes

Upon completion of this programme, students should be able to:

i. Demonstrate fundamental knowledge in imaging. (MQF1)
ii. Perform radiographic procedures competently. (MQF2)
iii. Demonstrate critical thinking and decision making related to medical imaging. (MQF6)
iv. Communicate effectively both in written and verbal at the professional and community level. (MQF5)
v. Function individually and as a team in the organization and the community. (MQF3/MQF5)
vi. Adhere to the legal, ethical principles and the professional code of conduct in medical imaging. (MQF4)
vii. Interpret and manage information as well as be able to recognize life-long learning for career development. (MQF7)
viii. Demonstrate self-motivation and recognize entrepreneurial opportunity in the field of radiography. (MQF8)
ix. Demonstrate leadership qualities in the organization of medical imaging. (MQF5)

3.0 ACADEMIC CALENDAR (SESSION 2020/2021)

MINGGU	TARIKH	
SEM I SESI 2020/21		
M1-M7	12/08/20 - 29/09/20	KULIAH / LECTURES
	30/09/20 - 03/10/20	MIDTERM BREAK
M8-M14	04/10/20 - 21/11/20	KULIAH / LECTURES
	22/11/20 - 28/11/20	REVISION WEEK
	29/11/20 - 19/12/20	EXAM WEEK
	20/12/20 - 09/01/20	END SEMESTER BREAK
SEM II SESI 2020/21		
M1-M7	10/01/20 - 27/02/20	KULIAH / LECTURES
	28/02/20 - 06/03/20	MIDTERM BREAK
M8-M14	07/03/20 - 24/04/20	KULIAH / LECTURES
	25/04/20 - 02/05/20	REVISION WEEK
	03/05/20 - 22/05/20	EXAM WEEK
	23/05/20 - 27/07/20	END SEMESTER BREAK

3.1 Courses Offered by Semester

******(TO BE REFERRED FOR REGISTERING COURSES EVERY SEMESTER)***

SESI PENAWARAN: SEM I 2020/2021 (Semester 1)

BIL	KOD KURSUS	NAMA KURSUS	KUMPULAN	JAM KREDIT
1	ASING1	KURSUS BAHASA ASING I	Kursus Bahasa Asing	2
2	KOKO	KURSUS KOKURIKULUM	Kursus Kokurikulum	3
3	MPU21022	PENGHAYATAN ETIKA DAN PERADABAN	Tiada Opsyen	2
4	MPU22012	ENGLISH I	Tiada Opsyen	2
5	MPU22022	ENGLISH II	Tiada Opsyen	2
6	MPU23012	AKIDAH DAN AKHLAK	Kumpulan 1	2
7	MPU23022	MORAL DAN ETIKA I	Kumpulan 1	2
8	MPU23032	FIQH IBADAT	Kumpulan 2	2
9	MPU23042	PERBANDINGAN AGAMA I	Kumpulan 2	2
10	MPU23052	TAJWID AL-QURAN	Kumpulan 3	2
11	MPU23062	ETIKET SOSIAL DAN PENAMPILAN DIRI	Kumpulan 3	2
JUMLAH JAM KREDIT SEMESTER				17

SESI PENAWARAN: SEM II 2020/2021 (Semester 2)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBR10202	PATHOLOGY I	Kursus Teras Program	Tiada Opsyen	2
2	DBR10303	APPLIED PHYSICS	Kursus Teras Program	Tiada Opsyen	3
3	DBR11002	GENERAL RADIOGRAPHIC INSTRUMENTATION	Kursus Teras Program	Tiada Opsyen	2
4	DBR11103	HUMAN ANATOMY & PHYSIOLOGY I	Kursus Teras Program	Tiada Opsyen	3
5	DBR11302	PATIENT CARE IN RADIOGRAPHY I	Kursus Teras Program	Tiada Opsyen	2
6	DBR11402	MEDICAL IMAGING I	Kursus Teras Program	Tiada Opsyen	2
7	DBR11602	PATIENT CARE IN RADIOGRAPHY II	Kursus Teras Program	Tiada Opsyen	2
8	DBR20302	RADIATION PROTECTION	Kursus Teras Program	Tiada Opsyen	2
JUMLAH JAM KREDIT SEMESTER					18

SESI PENAWARAN: SEM PENDEK 2021/2022 (Semester 3)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBR11804	CLINICAL PRACTICE I	Kursus Teras Program	Tiada Opsyen	4
JUMLAH JAM KREDIT SEMESTER					4

SESI PENAWARAN: SEM I 2021/2022 (Semester 4)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBR10802	PATHOLOGY II	Kursus Teras Program	Tiada Opsyen	2
2	DBR10902	RADIATION PHYSICS	Kursus Teras Program	Tiada Opsyen	2
3	DBR11503	HUMAN ANATOMY & PHYSIOLOGY II	Kursus Teras Program	Tiada Opsyen	3
4	DBR11702	MEDICAL IMAGING II	Kursus Teras Program	Tiada Opsyen	2
5	DBR20103	SPECIALIZED RADIOGRAPHIC INSTRUMENTATION	Kursus Teras Program	Tiada Opsyen	3
6	DBR20403	CONVENTIONAL IMAGING PROCESS	Kursus Teras Program	Tiada Opsyen	3
7	DBR20503	SPECIALIZED IMAGING I	Kursus Teras Program	Tiada Opsyen	3
JUMLAH JAM KREDIT SEMESTER					18

SESI PENAWARAN: SEM II 2021/2022 (Semester 5)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBR20607	CLINICAL PRACTICE II	Kursus Teras Program	Tiada Opsyen	7
2	DBR20708	CLINICAL PRACTICE III	Kursus Teras Program	Tiada Opsyen	8
JUMLAH JAM KREDIT SEMESTER					15

SESI PENAWARAN: SEM I 2022/2023 (Semester 6)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBR20202	MEDICAL IMAGING III	Kursus Teras Program	Tiada Opsyen	2
2	DBR30102	SPECIALIZED IMAGING II	Kursus Teras Program	Tiada Opsyen	2
3	DBR30202	DIGITAL IMAGING PROCESS	Kursus Teras Program	Tiada Opsyen	2
4	DBR30502	QA IN DIAGNOSTIC IMAGING	Kursus Teras Program	Tiada Opsyen	2
5	DBR30602	BASIC MANAGEMENT	Kursus Teras Program	Tiada Opsyen	2
6	DBR30802	SECTIONAL ANATOMY	Kursus Teras Program	Tiada Opsyen	2
7	DBR30903	RADIOGRAPHIC ANATOMY AND IMAGE ANALYSIS	Kursus Teras Program	Tiada Opsyen	3
8	DBR31002	BIOSTATISTIC	Kursus Elektif Program	Kumpulan 1	2
9	DBR31102	BASIC HUMAN PSYCHOLOGY	Kursus Elektif Program	Kumpulan 1	2
JUMLAH JAM KREDIT SEMESTER					17

SESI PENAWARAN: SEM II 2022/2023 (Semester 7)

BIL	KOD KURSUS	NAMA KURSUS	KOMPONEN	KUMPULAN	JAM KREDIT
1	DBR30907	CLINICAL PRACTICE IV	Kursus Teras Program	Tiada Opsyen	7
2	DBR31008	CLINICAL PRACTICE V	Kursus Teras Program	Tiada Opsyen	8
JUMLAH JAM KREDIT SEMESTER					15

JUMLAH JAM KREDIT DIPERLUKAN : 104

4.0 STUDENT ASSESSMENT METHOD

4.1 Types of Assessments

4.1.1 Formative Assessment (Tutorials/Lab Activities)

Formative assessment is conducted to monitor student learning progress during learning process. The feedback from this assessments is used to identify areas or topics that need more attention and does not affect the grading of the **FINAL** marks.

4.1.2 Continuous Assessment (Conass)/ Presentation

Continuous assessments are given to assess and evaluate student's performance and level of understanding for each course. These high-stakes assessments contribute for 40-50% of the total **FINAL** marks.

4.1.3 Summative Assesment

Summative assessment includes written 'Final Examination' or 'Objective Structured Practical/Clinical Examination (OSPE/OSCE)' at the end of the semester. This assessment contribute 50-60% of the total **FINAL** marks.

Total Marks of Written Final Examination (Summative Assessment)

CREDIT HOUR	DURATION	TOTAL MARKS
1	1 hour	50%
2	2 hours	70%
3	2 hours 30 minutes	100%
4	2 hours 30 minutes	100%

4.2 Clinical Practice Evaluation

4.2.1 Components of Clinical Practice Evaluation may include:

- Records of clinical practice (logbook).
- Assessment of professional attitude.
- Clinical workbook.
- Clinical assessments (refer 4.2.2 for types of radiographic examinations being assessed)
- Objective Structured Practical Examination (OSPE).

4.2.2 Types of Examinations

- Chest
- Upper and lower extremities
- Abdomen
- Vertebra column
- Skull
- Ward (portable/mobile)
- Intravenous Urography
- Non-ambulant

Clinical assessment takes into account the complexity of the radiographic procedures. These will be examined based on the scoring criteria to assess student's clinical competence. Students should complete and record at least 90% of cases required in logbook for each semester.

4.2.3 The Clinical Practice Evaluation are intended to enable the trainees to:

- use the basic knowledge and skills needed by a radiographer in the evaluation of patients and treatment in a practical environment.
- develop and acquire skills to assess, consider and solve clinical problems in radiography with creative, critis and flexible approach.
- develop self-management skills in medical imaging organization.

4.2.4 Compulsory requirements of Clinical Practice Evaluation.

- Student must pass in the OSPE.
- If the student fails, he/she will be allowed to re-sit. However, the total marks of workbook will be deducted by 10%.
- If the student fails again, grade 'F' will be given.

5.0 SCORING GRADES

5.1 Scoring Grade for Core Courses

Scores	Grade	Grade Point	Mean
80 – 100	A	4.00	Excellent
75 – 79	A-	3.67	
70 – 74	B+	3.33	Good
65 – 69	B	3.00	
60 – 64	B-	2.67	Medium
55 – 59	C+	2.33	
50 – 54	C	2.00	
47 – 49	C-	1.67	Failed
44 – 46	D+	1.33	
40 – 43	D	1.00	
39 and below	F	0.00	

5.2 Scoring Grade for University Courses

Scores	Grade	Grade Point	Mean
80 – 100	A	4.00	Excellent
75 – 79	A-	3.67	
70 – 74	B+	3.33	Good
65 – 69	B	3.00	
60 – 64	B-	2.67	Medium
55 – 59	C+	2.33	
50 – 54	C	2.00	
47 – 49	C-	1.67	Minimum Achievement
44 – 46	D+	1.33	
40 – 43	D	1.00	
39 and below	F	0.00	Failed

6.0 ACADEMIC REGULATIONS

6.1 Assessment of Students' Performance

- Students with CGPA ≥ 2.00 are considered **PASSED** and are allowed to proceed to the next semester.

- Students with CGPA between 1.70 and 2.00 are considered **CONDITIONAL PASSED (*Lulus Bersyarat* – LB)** and placed under academic probation period. Students may be allowed to continue their studies until they achieve CGPA of 2.0 and above. If NOT, the status of **GB (*Gagal Berhenti*)** will be given.

- Students with CGPA < 1.70 are considered **FAILED** and will be terminated.

- Students who **FAILED** in any of the same subjects 3 times in a row will be given the status of **GB.**

6.2 Compulsory requirements for Diploma

A student must meet all of the following requirements to be awarded with a Diploma in Radiography;

- Achieve a minimum PNGK/CGPA of 2.00.

- Has completed the 112 credit hours.

- Has completed Clinical Practice I to VI.

7.0 LIST OF TEXTBOOKS

ANATOMY AND PHYSIOLOGY I (DBR 10103) & II (DBR 10703):

1. W. Anne & Grant A. (2011) *Ross and Wilson Anatomy and Physiology in Health and Illness*. (11th Ed.) Churchill Livingstone: Elsevier.
2. Tortora G. J., Derrickson B. H. (2011) *Introduction to the Human Body*. Wiley.
3. Elaine N. M. &Katja H. (2012) *Human Anatomy & Physiology* (9th Ed.) Benjamin Cummings.
4. Applegate E. J. (2009) *The Sectional Anatomy Learning System: Concepts and Applications*. (3rd Ed.) Saunders.

PATHOLOGY I (DBR 10202) & II (DBR 10802):

1. Kowalczyk, N. & Mace, J.D. (2009) *Radiographic Pathology for Technologists* (5th Ed.) St Louis: Mosby.
2. Eisenberg, R. L. & Johnson, N. M. (2011) *Comprehensive Radiographic Pathology* (5th Ed.) St Louis: Mosby.
3. Kumar V., Abbas A.K., Fausto N., Mitchell R. (2012) *Robbins Basic Pathology: With Student Consult Online Access* (8th Ed.) Philadelphia: Saunders.

APPLIED PHYSICS (DBR 10303) & RADIATION PHYSICS (DBR 10902):

1. James Johnston, Terri L. FauberEdD RT (2011) *Essentials of Radiographic Physics and Imaging*, (1st Ed.) Mosby.
2. Ken Holmes, Marcus Elkington, Phil Harris (2013) *Clark's Essential Physics in Imaging for Radiographers* (1st Ed.) CRC Press.
3. Stewart C. Bushong, (2012) *Radiologic Science for Technologists: Physics, Biology, and Protection* (10th Ed.) Radiologic Science for Technologists: Phys, Biol & Protection: Elsevier.

PATIENT CARE IN RADIOGRAPHY I (DBR 11302) & II (DBR 11602):

1. Ehrlich, R.A. (2012) *Patient Care in Radiography: with an Introduction to Medical Imaging* (8th Ed.) Mosby, Portland.

MEDICAL IMAGING I (DBR 11402) & II (DBR 11702):

1. Kenneth L. Bontrager & John Lampignano (2013) *Text book of Radiographic Positioning and Related Anatomy* (8th Ed.) Mosby.
2. Ruth Sutherland, (2003) *Pocketbook of Radiographic Positioning*. Elsevier Health Sciences.
3. Swallow R.A. & Naylor, E. (2013) *Clark's Positioning in Radiography* (12th Ed.) CRC Press
4. Eugene D. Frank, Bruce W. Long, Barbara J. Smith (2011) *Merill's Atlas of Radiographic Positioning & Procedures* (12th Ed.) Mosby.

5. Kathy McQuillen Martensen, (2010) *Radiographic Image Analysis* (3rd Ed.) Saunders.

MEDICAL IMAGING III (DBR 20202) & SPECIALIZED IMAGING I (DBR 20503):

1. Bontrager K. L. (2014) *Textbook of Radiographic Positioning and Related Anatomy*, Mosby.
2. Frank E. D. (2007) *Merrill's Atlas of Radiographic Positioning and Procedures: 3-Volume Set* (12th Ed.) Mosby.
3. Whitley A. S., Sloane C., Hoadley S., Moore A. D., Alsop C.W. (2005) *Clark`s Positioning in Radiography* (12th Ed.) CBS Publishers.
4. McQuillen-Martensen (2011) *Radiograpic Image Analysis* (3rd Ed.) Saunders.
5. Ruth Sutherland (2003) *Pocketbook of Radiographic Positioning*, Elsevier Health Sciences.

SPECIALIZED IMAGING II (DBR 30102):

1. Bontrager K. L. (2014) *Textbook of Radiographic Positioning And Related Anatomy*, Mosby.
2. Frank E. D. (2007) *Merrill's Atlas of Radiographic Positioning and Procedures: 3-Volume Set* (12th Ed.) Mosby.
3. Whitley A. S., Sloane C., Hoadley S., Moore A. D., Alsop C.W. (2005) *Clark`s Positioning in Radiography* (12th Ed.) CBS Publisher
4. P.E.S Palmer. (2002) *Manual Of Diagnostic Ultrasound*, WHO

GENERAL RADIOGRAPHIC INSTRUMENTATION (DBR 11002), SPECIALIZED RADIOGRAPHIC INSTRUMENTATION (DBR 20103) & CONVENTIONAL IMAGING PROCESS (DBR 20403):

1. Carlton, R. R. & Adler, A.M., (2012). *Principles of Radiographic Imaging*: *An Art and A Science* (5th Ed.) Delmar: Cengage Learning
2. Stewart C. Bushong**,** (2012) *Radiologic Science for Technologists: Physics, Biology, and Protection* (10th Ed.) Elsevier
3. Jerrold T. Bushberg (2012) *The Essential Physics of Medical Imaging*, (3rd Ed.) Lippincott Williams & Wilkins.
4. David Dowsett, Patrick A Kenny R Eugene Johnston (2006) *The Physics of Diagnostic Imaging* (2nd Ed.) CRC Press.
5. James Johnston, Terri L. Fauber (2011) *Essentials of Radiographic Physics and Imaging* (1st Ed.) Mosby.
6. Carter P H et al, (1994) *Chesney's Equipment for Student Radiographers*, Blackwell Science.

DIGITAL IMAGING PROCESS (DBR 30202):

1. Bourne, R. (2010) *Fundamentals of Digital Imaging in Medicine*, Springer London.
2. Carlton, R., & Adler, A. (2013) *Principles of Radiographic Imaging: An Art and A*

Science (5th Ed.) Cengage Learning.
3. Lanca, L., & Silva, A. (2013) *Digital Imaging Systems for Plain Radiography*, Springer New York.
4. Jerrold T. Bushberg (2011) *The Essential Physics of Medical Imaging (3rd Ed.)* Lippincott Williams & Wilkins
5. Stewart C. Bushong (2012) *Radiologic Science for Technologists: Physics, Biology, and Protection* (10th Ed.) Radiologic Science for Technologists: Phys, Biol & Protection: Elsevier
6. Caroll, Q. B. (2007) *Practical Radiographic Imaging*, Charles C Thomas Publisher.
7. Seutens, P. (2009) *Fundamentals of Medical Imaging*, Cambridge University Press.
8. Craig, T. Stepherd (2003) *Radiographic Image Production and Manipulation*, Colombus: McGraw-Hill.
9. Ball, J et al (2001) *Chesney's Radiographic Imaging*, Oxford: Blackwell Scientific Publication.
10. Sprawls, P (1995) *Physical principles of medical imaging*, Medical Physics USA: Aspen Publishers.

RADIATION PROTECTION (DBR 20302):

1. Malaysia Standard Ms 838 (2007) *Code Of Practice For Radiation Protection - Medical X-Ray Diagnosis*
2. IAEA, (2011) Basic Safety Standard
3. Mary Alice StatkiewiczSherer, Paula J. Visconti, E. Russell Ritenour, (2011) *Radiation Protection in Medical Radiography* (6th Ed.) Mosby.
4. Martin, Harbison, Beach, Cole (2012) *An Introduction To Radiation Protection* (6th Ed.) Hodder Arnold
5. Stewart C. Bushong (2012) *Radiologic Science for Technologists: Physics, Biology and Protection* (10th Ed.) Elsevier
6. Steve Forshier (2008) *Essentials of Radiation, Biology And Protection* (2nd Ed.) Delmar Cengage Learning
7. Abd Khalik, Azali (2006) *Handbook of Radiation Protection*

BASIC MANAGEMENT (DBR 30602):

1. Sharon B. Buchbinder, Nancy H. Shanks, Jones & Bartlett Learning (2011) *Introduction To Health Care Management*
2. James A. Johnson (2013) *Introduction to Public Health Organizations, Management, and Policy*, Public Health Basics

SECTIONAL ANATOMY (DBR 30802):

1. Applegate E. J. (2010) *The Sectional Anatomy Learning System* (3rd Ed.) Elsevier: Mosby.
2. Torsten B. Moeller & Emil Reif (2010) *Pocket Atlas of Radiographic Anatomy* (3rd Ed.)

Flexibooks: Thieme.
3. Lorrie L. Kelley & Connie Peterson (2012) *Sectional Anatomy for Imaging Professionals* (3rd Ed.) Elsevier: Mosby.

RADIOGRAPHIC ANATOMY AND IMAGE ANALYSIS (DBR 30903):

1. McQuillen-Martensen (2015) *Radiographic Image Analysis*, Saunders
2. Kenneth L. Bontranger (2013) *Text book of Radiographic Positioning and Related Anatomy*, Mosby.
3. Vinitta Merrill (2016) *Merill`s Atlas of Radiographic Positioning &Procedures*, Mosby.
4. Swallow R.A and Naylor E (2015) *Clark`s Positioning in Radiography*, CBS Publishers.

QUALITY ASSURANCE IN DIAGNOSTIC RADIOGRAPHY (DBR 30502):

1. Andrea T.S, (2000) *Quality Management for Radiographic Imaging,* McGraw-Hil/Appleton & Lange
2. Jeffrey Papp (2010) *Quality Management in the Imaging Sciences (*4th Ed.) Mosby
3. Moores B et al, (1987) *Practical Guide to Quality Assurance in Medical Imaging*, John Wiley & Sons Ltd
4. Forster E, (1986) *Equipment for Diagnostic Radiography*, MTP Press.
5. Stockley S, (1986) *A Manual of Radiographic Equipment*, Churchill Livingstone.

BIOSTATISTICS (DBR 31002):

1. Yaacob, M. R. (2013) *SPSS 20 for Business and Social Science Students* (1st Ed.) Eduserve Resources.
2. Coakes (2012) *Analysis without Anguish with SPSS V20*, John Wiley & Sons Inc.
3. John W. C. (2013) *Crewell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th Ed.) SAGE Publications, Inc.
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