Cytotechnology is a specialty within the broad field of clinical laboratory sciences. The cytotechnologist, working under the direction of a pathologist, detects cell changes caused by different disease processes and is able to differentiate between normal, atypical, and malignant cell changes. In recognizing microscopic abnormalities of cells and cellular patterns from various body sites, the cytotechnologist assists the pathologist in detecting cancer at its earliest and potentially most curable stage. As a result, physicians are able to diagnose and treat cancer by alternate methods long before discovering its existence.

Opportunities
Cytotechnologists work in hospitals, clinics, and independent pathology laboratories. The employment outlook for cytotechnologists is favorable, with the demand for trained technologists exceeding the supply. Cytotechnologists can advance to supervisory positions, participate in research activities, or become teachers in the field. Advancement is based on experience, skill, and advanced education.

The program
The two-year Cytotechnology Program leads to a Bachelor of Science degree. The Bachelor of Science degree program requires completion of two years of prerequisite courses at an accredited college or university. Accepted students transfer to the program at the junior year level. The program of study begins in the Fall Quarter. Upon satisfactory completion of the program, the student is awarded a Bachelor of Science degree and is eligible to take the national board of certification examination to become a registered cytotechnologist.

The junior year includes lecture and laboratory, with an emphasis on basic cytology courses. The senior year includes an 11-week clinical practicum and advanced courses in histology, pathology, and laboratory management.

Program learning outcomes
By the end of this program, the graduate should be able to:

1. Accurately evaluate cellular abnormalities by applying differential diagnoses in the framework of patient outcome management.
2. Fulfill the ethical role and responsibilities of the cytotechnologist.
3. Assess the results of quality assurance measures and institute proper procedures to maintain test accuracy.
4. Comprehend and apply sound principles of scientific research.
5. Advocate rules and regulations with emphasis on patient and workplace safety.

Clinical affiliations
Multiple clinical affiliations enrich the student’s clinical training by providing exposure to different specimen types in the clinical environments. During the 11-week clinical practicum, supplemental training may be scheduled at any of the following clinical sites:

Primary affiliation
Loma Linda University Medical Center
Loma Linda, California

Supplementary affiliations
Loma Linda Pathology Group
Faculty Medical Offices
Loma Linda, California

Jerry L. Pettis Memorial Veterans Medical Center
Loma Linda, California

Quest Diagnostics
West Hills, California

Transportation to scheduled assignments
Transportation to scheduled clinical rotations is the responsibility of the student. Depending upon assignment, commute times may be up to two hours one way. During the clinical practicum, the senior-year schedule is a full-time week (40 hours/week, eight hours/day).

Professional registration
Upon completion of the baccalaureate degree, the student is eligible to take the certifying examination given by the Board of Certification of the American Society for Clinical Pathology (ASCP), 33 West Monroe, Suite 1600, Chicago, IL 60603; telephone: 312/541-4999; fax: 312/541-4998. Information about qualifying examinations can be obtained from the program director.

Academic progression
A minimum grade of C (2.0) is required for all courses in the program. C-grades are not acceptable. A student who receives a grade less than C in any academic course or receives an unsatisfactory rating in clinical performance will be disqualified from the program for the remaining academic year. Readmission to the program will require reapplication.

Accreditation
The program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP)—25400 U.S. Highway 19 North, Suite 158, Clearwater, FL 33763, telephone: 727/210-2350; fax: 727/210-2354—in collaboration with the Cytotechnology Programs Review Committee, which is sponsored by the American Society of Cytopathology (ASC); the American Society for Clinical Pathology (ASCP); the American Society for Cytotechnology (ASCT), and the College of American Pathologists (CAP). Information regarding cytotechnology accreditation status can be obtained from the CPRC at the American Society for Cytopathology, 100 West 10th Street, Suite 1600, Chicago, IL 60603; telephone: 312/541-4999; fax: 312/541-4998. Information about qualifying examinations can be obtained from the program director.

Admissions
In addition to Loma Linda University (http://llucatalog.llu.edu/about-university/admission-policies-information/admissionrequirementstext) and School of Allied Health Professions (http://llucatalog.llu.edu/allied-health-professions/#generalregulationsstext) admissions requirements, the applicant must also complete the following requirements:

- prerequisite course work at any accredited college before being admitted to the School of Allied Health Professions; projected course work that will be completed before beginning the program will be
Application deadlines

Applications to the Cytotechnology Program are accepted beginning January 1. Early submission of application is recommended. Applications continue to be reviewed and accepted until July 1 or until program is filled. Preference will be given to applicants whose completed applications and transcripts are received by March 1. Complete an online application at <llu.edu/apply>. The B.S. degree program begins in September with the start of fall quarter.

Applicants must complete prerequisite course work at any accredited college or university prior to being admitted to the School of Allied Health Professions; projected course work that will be completed before beginning the program will be considered in the application process.

Prerequisite for Cytotechnology, B.S.

- Humanities—20 units minimum chosen from at least three of the following areas: civilization/history, fine arts, literature, modern language, performing/visual arts (not to exceed four quarter units), philosophy, or general humanities elective.
  - Included in the 20-unit minimum, four units of religion per year of attendance at a Seventh-day Adventist college or university

General biology with laboratory, complete sequence

Human anatomy and physiology with laboratory, complete sequence

Microbiology with laboratory

General chemistry with laboratory, complete sequence

Organic chemistry with laboratory, complete sequence

College mathematics (algebra or higher level)

Cultural anthropology or cultural diversity (one course)

Select eight units from a minimum of two areas:
  - Sociology, economics, geography, political science, psychology, anthropology

English composition, complete sequence (minimum of nine quarter units)

Personal health or nutrition

Two physical activity courses

Electives to meet the minimum total requirement of 98 quarter units

For total unit requirements for graduation, see LLU General Education Requirements (http://llucatalog.llu.edu/about-university/division-general-studies/#courserequirementstext).

Program requirements

Junior Year

**Autumn Quarter**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tr>
<td>AHCJ 328</td>
<td>Wholeness Portfolio I</td>
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<tr>
<td>CLSM 331</td>
<td>Biochemistry</td>
<td>5</td>
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<tr>
<td>CLSC 341</td>
<td>Gynecologic Cytology</td>
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<tr>
<td>RELT 423</td>
<td>Loma Linda Perspectives</td>
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**Winter Quarter**

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<tr>
<td>AHCJ 402</td>
<td>Pathology I</td>
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<tr>
<td>CLSC 351</td>
<td>Respiratory Cytology</td>
<td>8</td>
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<tr>
<td>CLSC 353</td>
<td>Urinary Tract and Prostate Cytology</td>
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<td>RELE 457</td>
<td>Christian Ethics and Health Care</td>
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**Spring Quarter**

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<tr>
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<td>Pathology II</td>
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<tr>
<td>CLSC 357</td>
<td>Gastrointestinal Tract Cytology</td>
<td>2</td>
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<td>CLSC 364</td>
<td>Body Fluid Cytology</td>
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<td>CLSC 381</td>
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**Senior Year**

**Summer Quarter 1**

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<tr>
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<td>CLSC 373</td>
<td>Histotechnology Techniques</td>
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<td>CLSC 382</td>
<td>Fine Needle Aspiration Cytology II</td>
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<td>CLSM 435</td>
<td>Immunoassay and Molecular Diagnostic Techniques</td>
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<td>CLSC 481</td>
<td>Supervised Cytology Research Project I</td>
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**Autumn Quarter**

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<td>CLSC 301</td>
<td>Introduction to Radiographic Procedures I</td>
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<td>CLSC 411</td>
<td>Histopathology I</td>
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<td>CLSC 482</td>
<td>Supervised Cytology Research Project II</td>
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<td>CLSM 451</td>
<td>Clinical Laboratory Management I</td>
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<tr>
<td>RELT 415</td>
<td>Christian Theology and Popular Culture</td>
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**Winter Quarter**

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<tr>
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<td>CLSC 412</td>
<td>Histopathology II</td>
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<td>CLSC 432</td>
<td>Current Research Techniques</td>
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<td>CLSC 471</td>
<td>Advanced Cytology Practices I</td>
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<td>CLSM 452</td>
<td>Clinical Laboratory Management II</td>
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</tr>
<tr>
<td>RELT 416</td>
<td>God and Human Suffering</td>
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**Spring Quarter**

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<td>CLSC 494</td>
<td>Cytology Practicum</td>
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Total Units: 106

Microscope rental fees and usage-and-replacement fees are required throughout the program.

Normal time to complete the program

Four (4) years (two [2] years prior to LLU plus two [2] years [22 months] at LLU) — full-time only

Courses

**CLSC 301. Introduction to Radiographic Procedures I. 2 Units.**

Introduces the nature and description of radiographic procedures for the nonradiologic technologist, with an emphasis on radiographic procedures used in the collection of cytologic specimens. Applies principles, medical techniques, and instrumentation to a radiographic setting. Includes observation laboratory.
CLSC 302. Introduction to Radiographic Procedures II. 2 Units.
Introduces the nature and description of radiographic procedures for the nonradiologic technologist, with an emphasis on radiographic procedures used in the collection of cytolologic specimens. Applies principles, medical techniques, and instrumentation to a radiographic setting. Includes observation laboratory.

CLSC 341. Gynecologic Cytology. 11 Units.
Study of the anatomy, histology, and cytology of the female genital tract—including cytohormonal changes, nonneoplastic abnormalities, premalignant and malignant lesions, and rare extrauterine malignancies. Students interpret clinical history, explain significance of data, render diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 351. Respiratory Cytology. 8 Units.
Study of the anatomy, histology, and cytology of the respiratory tract—including fine needle aspiration of the lung. Students interpret clinical history, explain significance of data, render diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 353. Urinary Tract and Prostate Cytology. 3 Units.
Study of the anatomy, histology and cytology of the urinary tract—including the bladder, ureters, renal pelvis, kidney, and prostate. Students interpret clinical history, explain significance of data, render diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 357. Gastrointestinal Tract Cytology. 2 Units.
Study of the anatomy, histology, and cytology of the gastrointestinal tract—including the esophagus, stomach, small and large intestines, and colon. Students interpret clinical history, explain significance of data, render diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 364. Body Fluid Cytology. 5 Units.
Anatomy, histology, and cytology of fluids from serosal cavities, including CSF. Students interpret clinical history, explain significance of data, render diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 371. Cytopreparation Techniques. 3 Units.
Collection techniques; fixation and staining procedures; preparation of monolayers, smears, and cell blocks from various cytolologic specimens. Includes basic laboratory skills, such as universal precautions, reagent preparation, centrifugation, pipetting, and micropipetting. Introduces basic laboratory operations, including quality control, quality assurance, laboratory safety, and emergency preparedness. Lecture, demonstration, and laboratory.

CLSC 373. Histotechnology Techniques. 1 Unit.
Technical preparation of tissue specimens for microscopic evaluation, with emphasis on special stains and immunohistochemistry. Lecture and observation laboratory.

CLSC 381. Fine Needle Aspiration Cytology I. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 382. Fine Needle Aspiration Cytology II. 6 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 383. Fine Needle Aspiration Cytology III. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 384. Fine Needle Aspiration Cytology IV. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 385. Fine Needle Aspiration Cytology V. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 386. Fine Needle Aspiration Cytology VI. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 387. Fine Needle Aspiration Cytology VII. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 388. Fine Needle Aspiration Cytology VIII. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 389. Fine Needle Aspiration Cytology IX. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 390. Fine Needle Aspiration Cytology X. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.

CLSC 391. Fine Needle Aspiration Cytology XI. 4 Units.
Study of the benign and malignant cells aspirated from thyroid, salivary gland, breast, liver, pancreas, lymph node, soft tissue masses, and other miscellaneous organs. Includes fine needle aspiration techniques, touch prep of cores preparation, and rapid on-site adequacy assessment. Students interpret clinical history, explain significance of data, render adequacy assessment and/or diagnoses, and offer recommendations for further testing. Lecture and laboratory.