



## Geosynthetic Institute

### **Introduction to the Geosynthetic Certification Institute’s Geosynthetic Designer Certification Program (GCI-GDCP)**

The Geosynthetic Certification Institute’s Geosynthetic Designer Certification Program (GCI-GDCP) is meant for those engineers designing with geosynthetic materials. The program is administered by the Geosynthetic Certification Institute, which is a branch of the Geosynthetic Institute. GSI is located in Folsom, Pennsylvania about four-miles from the Philadelphia International Airport. Dr. Robert M. Koerner (Program Director), Dr. George R. Koerner (Oversight) and Ms. Jamie Koerner (Administrator) are the principals involved.

#### **Justification and Need for the “Geosynthetic Designer Certification Program”**

The national and global status of geosynthetics-aware graduating engineers, as well as new employees entering into geosynthetics design and consulting organizations is presently not only weak, but shows no promise of improving.

In both situations (i.e., graduating students and other new employees), entry level men and women have little or no idea of the plethora of available geosynthetic materials or of the myriad applications they serve. To give data regarding the available talent pool, the following 2015 statistics are available from the American Society for Engineering Education (ASEE) for the USA and from Wikipedia for worldwide data (see Table 1).

Table 1 - Status of Graduating Engineers and Civil Engineers in 2015

<b>Category</b>	<b>USA</b>	<b>Worldwide (except USA)</b>
Colleges/Universities with Engineering Programs	1,723	7,000 (est.)
All Engineering Bachelor Degrees	83,001	1,000,000 (est.)
Civil Engineering	12,157	150,000 (est.)
All Engineering Masters Degrees	46,940	50,000 (est.)
Civil Engineering	4,739	15,000 (est.)
All Engineering Doctoral Degrees	9,582	15,000 (est.)
Civil Engineering	747	2,000 (est.)

Only a miniscule few of these graduates have been exposed to geosynthetics much less its many design idiosyncrasies. This, of course, leaves the onus of geosynthetics education to the agency, owner, consultant, testing lab, or manufacturer, to the employer! Indeed it is challenging and expensive (for both the employer and individual) once a new untrained individual enters geosynthetics design employment as his/her profession.

Let's address the geosynthetic implementation status at the college/university level. Looking at the many disciplines comprising the geosynthetics field, the logical entry discipline for formal training is civil engineering. This does not mean that other engineering disciplines, such as chemical, materials, mechanical, electrical, environmental, etc., cannot be involved, it's just that a dedicated course in geosynthetics is not likely. Students in disciplines other than engineering (such as chemistry, business, law, economics, marketing, etc.) are also not likely to have any exposure to geosynthetics.

The next question is, why are colleges and universities with civil engineering programs not teaching geosynthetics? The reasons are many, including;

- university administrative pressures to reduce overall course credits for graduation,
- university administrative pressure to have more social and liberal courses within engineering curricula,
- departmental administrative pressures to have fewer specialized technical courses,
- departmental faculty competition with many other specialized technical courses,
- departmental costs (and space) involved in setting up a geosynthetics laboratory, and
- departmental requirements of sufficient student enrollment for a geosynthetic course to justify a faculty member's teaching commitment.

To be sure, efforts to encourage geosynthetic education at the college and university level have been made, most notable in the "Educate-the-Educators" programs. For five consecutive summers, from 1994 to 1998, a one-week course on geosynthetics was given at Auburn University under the guidance of Prof. David Elton. In a survey made by GSI in 2012 (14 to 18 years later), out of a total of 136 participants who took these courses only 18 had given a geosynthetic course at their home institution.

A second survey made through the United States Universities Council on Geotechnical Education and Research (USUCGER) found that only 24 colleges and universities taught a stand-alone geosynthetics course in 2014. That said, there are many existing courses being taught that include some aspects of geosynthetics. For example, the following applies in this regard;

- geomembranes and geosynthetic clay liners for liners in landfill related courses,
- geogrids and geotextiles for walls, slopes and filters in geotechnical related courses,
- geotextiles (and other geosynthetics) for highway pavement courses, and
- geopipe (and other geosynthetics) for liquid distribution in hydraulics related courses.

However, such existing civil engineering courses hardly do justice to explain the complete geosynthetics technology, much less make a graduating student see the field in a holistic sense and be able to eventually design accordingly.

In order to partially solve, or at least to mitigate, the situation GSI has decided to provide a “Geosynthetic Designer Certification” program. The Geosynthetic Institute’s Board-of-Directors has approved the program as briefly described below. The teaching vehicle for the program is the entire textbook, written by Robert M. Koerner, titled “Designing With Geosynthetics”. It is in its 6<sup>th</sup> Edition (2012) and it, and its previous editions, have been used for teaching geosynthetics since 1984 at Drexel University and other universities as well. The current edition is available from the publisher Xlibris, as well as Amazon, Barnes & Noble and GSI in hardback (~\$70), softback (\$47) and e-book (\$7). This existing textbook, made for teaching a full nine-month academic year’s coursework, has been transformed into 1,468 PowerPoint® slides, each with a voice-over of about one minute per slide in order to augment the textbook. This on-line course directly follows the 914-page textbook, section-by-section, and page-by-page. The eight chapters include:

- Chapter 1 - Overview of Geosynthetics (1 section)
- Chapter 2 - Designing With Geotextiles (4 sections)
- Chapter 3 - Designing With Geogrids (1 section)
- Chapter 4 - Designing With Geonets (1 section)
- Chapter 5 - Designing With Geomembranes (4 sections)
- Chapter 6 - Designing With Geosynthetic Clay Liners (1 section)
- Chapter 7 - Designing With Geofoam (1 section)
- Chapter 8 - Designing With Geocomposites (1 section)

This on-line eight (8) chapter book is subdivided into fourteen (14) sections since the geotextile and geomembrane chapters are in multiple sections due to their lengths. The complete course is currently available on the Adobe Connect platform for \$1000 (GSI members) and \$3000 (nonmembers) for six-months viewing. **Please note that the course is not required for taking the certification examination**, however, in light of the specialized material, it is advised depending upon a candidate’s prior knowledge in geosynthetics design.

The required examination to become a certified designer of geosynthetics consists of 72 numeric related questions, five being from each of the fourteen sections mentioned earlier. Calculators and/or computers are necessary. A candidate must answer any 3 out of 5 questions in each of the 14 sections. Thus, the examination is based on 42 questions. A 70% correct score is necessary for certification as well as additional criteria mentioned later.