

## **CHEM-LEARN: THE NEW EChemTest® ACCOUNTING SYSTEM**

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### **1. Introduction**

EChemTest® [1] is the electronic Self Evaluation Session (SES) test service offered by the Virtual Education Community (VEC) standing committee of the ECTN [2] Association in order to evaluate Chemistry competences for workers, students and, more in general, individuals interested in self-evaluating their own Chemistry competences. EChemTest® SESs are up to one hour long electronic-test (e-test) sessions consisting of a set of 30 randomly selected Questions and Answers (Q&A)s run on the cloud by the local examiner using the open-source software EOL [3]. The large EChemTest® bank of Q&As covers entirely the de facto standard contents of the ECTN Eurolabels grouped into the Libraries: General Chemistry 1 (GC1), General Chemistry 2 (GC2), Analytical Chemistry 3 (AC3), Biological Chemistry 3 (BC3), Chemical Engineering 3 (CE3), Inorganic Chemistry 3 (IC3), Organic Chemistry 3 (OC3) and Physical Chemistry 3 (PC3). SESs are run either in a National Testing Centre (NTC or just TC) or in an Accredited Test Site (ATS) belonging to (or associated with) a member of ECTN signatory of the ad-hoc Memorandum of Understanding (MoU).

### **2. The debit/credit mechanism of the new ANNEX to the MoU**

On January 1st of this year the new ANNEX1 to the Memorandum of understanding (MoU) implementing the relevant Prosumer [4] scheme regulating the debit/credit offsetting between ECTN and the EChemTest® TCs and ATSs of the member Universities approved in the year 2020 has come into operation. According to the new ANNEX1, TCs/ATSs may run for free up to 100 SESs for their own use. The running of additional SESs generates a debit of 3.5 euro per SES. If the SESs are run for ECTN or another TC/ATS, the corresponding debit will be transfer to them. The cost for a test taker having passed the SES and requesting the issuing of the relevant Individual Proficiency Certificate (IPC) is 40 euro. In the case of a SES delivered (in presence or on line) to third parties through the support of a TC/ATS, a cost of 60 euro applies. Such amount, to be paid by the test taker in advance, is credited for 1/3 each to ECTN, to the TC/ATS and to the Agency having promoted the activity. In this case, the IPC created for the passed SES is free (the SES can be repeated once for free in the case of failure during the first attempt).

### **3. The Chem-Learn Data correlation scheme**

CHEM-LEARN [5], is the accounting system developed in order to record the activities performed by TCs and ATSs when running SESs, questions creating and/or modifying Q&As and issuing IPCs. Beside the TC/ATS coordinators, other players need to interact on and through the Chem-Learn portal, at different levels. Of particular importance is the proper handling of the following relationships:

a) EOL to CHEM-LEARN: when one or more exams are archived in EOL, all the relevant data are uploaded to CHEM-LEARN both in order to quantify the number of sessions run per TC/ATS and to transfer relevant information onto IPCs;

- b) CHEM-LEARN to EOL: all the approved bookings registered in Chem-Learn are made available to EOL in order to determine if and how many sessions can be activated and run by each TC/ATS;
- c) TC/ATS to CHEM-LEARN: before starting any activities at the beginning of each solar year, all TC/ATSs must fill a planning form (subject to approval by the VEC Chair). An additional form is then used by the NTC/ATS coordinator to report, time by time, all the relevant activities in order to qualify the type of sessions run (own sessions, ETCN sessions, other member's sessions, third-party sessions), quantify the number and type of delivered certificates and other possible tasks (like the creation of new and/or the modification (and translation) of old questions and the activation of dissemination activities) that can be performed by them;
- d) ECTN/VEC to CHEM-LEARN: at board level, ECTN and/or the VEC Chair, approve bookings, monitor reports and the application of the credit/debit system. They can also register sessions when acting as an applicant (run own sessions using the facilities offered by a given NTC/ATS);
- e) SUPERVISOR to CHEM-LEARN: at supervisor level, in addition to monitor all the running connections, the accounting manager is requested to advertise users for certificates availability each time a process (a) takes place;
- f) USERS to CHEM-LEARN: a user (either an individual or an institution) can request a specific service (e.g. SESs, production/revision of a new question(s), and running some dissemination activities) to be hosted either by a specific NTC/ATS, or by an Agency (like the proposed Associated Test Institute (ATI) activated at their expenses by Upper Secondary Schools).

YEAR: 2021

NTC/ATS	CREDITS (euro)	IPC (euro)	THIRD-PARTY (euro)	PROMO FUND (euro)	TOTAL (euro)
ectn	0	213.33	140.00	140.00	493.33
ntc.at	-189	0.00	0.00	not applicable	-189
ntc.bl	0	0.00	0.00	not applicable	0
ntc.gr	0	0.00	0.00	not applicable	0
ntc.hu	-609	0.00	0.00	not applicable	-609
ats.genova.it	-42	80.00	0.00	not applicable	38
ats.milano.it	-1722	106.67	0.00	not applicable	-1615.33
ats.perugia.it	0	26.67	140.00	not applicable	166.67
ats.napoli.it	0	0.00	0.00	not applicable	0
ntc.nl	0	0.00	0.00	not applicable	0
ntc.pl	-73.5	0.00	0.00	not applicable	-73.5
ntc.ru	0	0.00	0.00	not applicable	0
ntc.si	0	0.00	0.00	not applicable	0
ntc.sp	0	0.00	0.00	not applicable	0
<b>BALANCE</b>	<b>-2635.5</b>	<b>426.67</b>	<b>280</b>	<b>140.00</b>	<b>2775.49</b>

**FIGURE 1:** EChemTest® financial balance for the period January-July 2021

The financial balance resulting from the Chem-Learn data correlation scheme described above for the period January-July 2021 is shown in Figure 1. It clearly confirms the sustainability of the regime introduced by the new ANNEX to the EChemTest® MoU. However, it has still to be considered largely incomplete because it cannot yet include data from the final yearly reports of the TC/ATSs.

## 4. Conclusions

Despite the two years dramatic discontinuity caused by COVID-19 in the progress of the EChemTest® activities, the introduction of a fully automated administrative process for establishing a sustainable delivery of IPCs has allowed the centralization of the relevant administrative processes at the ECTN secretariat level. The mechanism will be based on the fact that the CHEM-LEARN Portal will communicate with EOL containing all the IPCs produced from past SESs by a well-defined and secure protocol. This will increasingly help:

- a) the test taker in providing the needed information (evidence of the payment included) and in monitoring the progress of his/her IPC request,
- b) ECTN in qualifying the request as “verified” (rollback included) and notifying the Chair,
- c) the VEC Chair in signing the IPCs and putting the request in “ready” (rollback included),
- d) the TC/ATS Manager in repeatedly forwarding the IPC,
- e) the Secretariat in completing the administrative procedures and add the IPC to its official database.

A final important advantage of the new procedure is the possibility of involving in the process the Upper Secondary Schools and assign them the relevant credits.

## References

- [1] <http://ectn.eu/committees/virtual-education-community/echemtest>
- [2] <http://www.ectn.eu>
- [3] <https://echemtest.libreeol.org>
- [4] A. Laganà, O. Gervasi, S. Tasso, D. Perri, F. Franciosa, The ECTN Virtual Education Community prosumer model for promoting and assessing chemical knowledge, Lecture Notes Computer Science 10964, 533-548 (2018)
- [5] <https://www.chem-learn.com>